NOVEMBER, 1955

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and PLANT FOOD INDUSTRY

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Nitrogen Solutions (Nitrana® and Urana®)
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Urea Fertilizer
Sulphate of Ammonia

*Trade-mark

Call on us also for technical help based on 25 years of Nitrogen Solutions research and development. Improved new NITRANA®, URANA® and U-A-S* Nitrogen Solutions can help you turn out better-conditioned, top-quality mixed goods, often at lower cost. Ask for the help of one of our technical service representatives available to our customers without charge.

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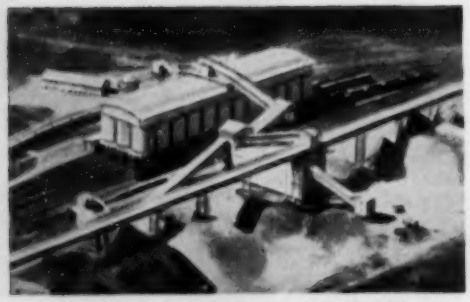

From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

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All grades of Florida Pebble Phosphate Rock
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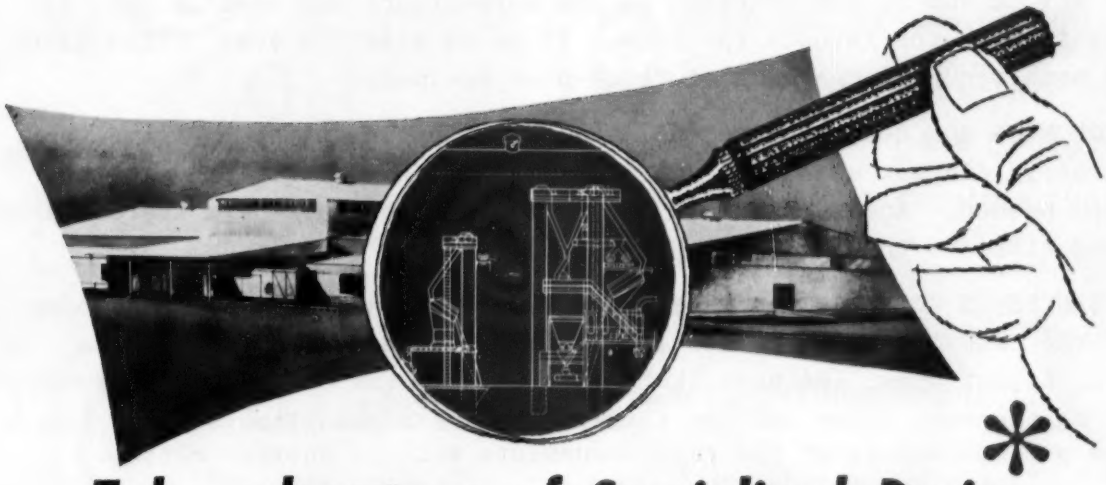
Commenting Freely

by BRUCE MORAN

"The man who needs a new machine is already paying for it" says Travis Whitsel of Union Special Machine Co., talking about obsolescence. And it is a very good point he makes. Obsolescence creeps up on us. Like our own aging, which we refuse to notice, our equipment gets old and worn. But equipment becomes obsolete when a new and better method comes along—even if it has not worn out—if the new and better method saves production cost, and turns out a better product.

When that is the case, we start paying for the new machine when we start to need it. And the longer we defer the change, the more it costs. I know a successful manufacturer whose basic philosophy on the purchase of equipment is to buy no machine that cannot pay for itself in three years. We cannot always reach such a goal in our industry. But the principle can well be modified to fit.

And if we apply this quick-liquidation plan, we are always ready to make the next changeover when it comes along, with our present equipment written off the books.



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JUST AROUND THE CORNER *by Vernon Mount*

IF NATURE WON'T, GINGER WILL, as the horse-track men used to say, is pretty much the keynote for 1956. It is an election year. That used to mean trouble--dragging of feet--poor business.

ECONOMICS ARE CONTROLLED these days. The Government has a valve that formerly did not exist...a valve that turns on payrolls and profits when needed. And in an election year you can be very sure there's a hand close to that valve all the time, ready to turn it on.

BUSINESS IS CONFIDENT, however, and Government spending is continuing at the same levels. Profits are good. Dividends are good. Taxes will be cut some. No boom, but a good year seems to be the consensus of management, labor and the thinking of the non-captive economists. The pronouncements of the kept economists will be another matter.

Yours faithfully,

Vernon Mount

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All Steel Self-Contained Fertilizer Mixing and Bagging Units

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Here's all you need to do:

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❷ Show the bags to a number of people—your customers, your salesmen, your banker, *anyone*—and ask them to pick out the bags with the *better printing* of your brand.

Try the test. Convince yourself.

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Koppers offers a good commercial grade of ammonium sulphate—the ingredient that is so essential to fertilizer because of its high nitrogen content.

CHARACTERISTICS

Koppers Ammonium Sulphate comes in crystals with low free-acid and moisture content. The nitrogen content is guaranteed to be not less than 20.5%.

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From St. Paul, Minn. and Kearny, N. J., Koppers Ammonium Sulphate is shipped in 100 lb. and 200 lb. bags—also in boxcars and trucks. From Granite City, Ill. and Midland, Pa., it is shipped only in boxcars and trucks.

You'll find that Koppers Company is a dependable source of supply for ammonium sulphate. Get in touch with us concerning your requirements.

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Tar Products Division
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KOPPERS Coal Chemicals

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CUTS CURING TIME

REDUCES INVENTORY

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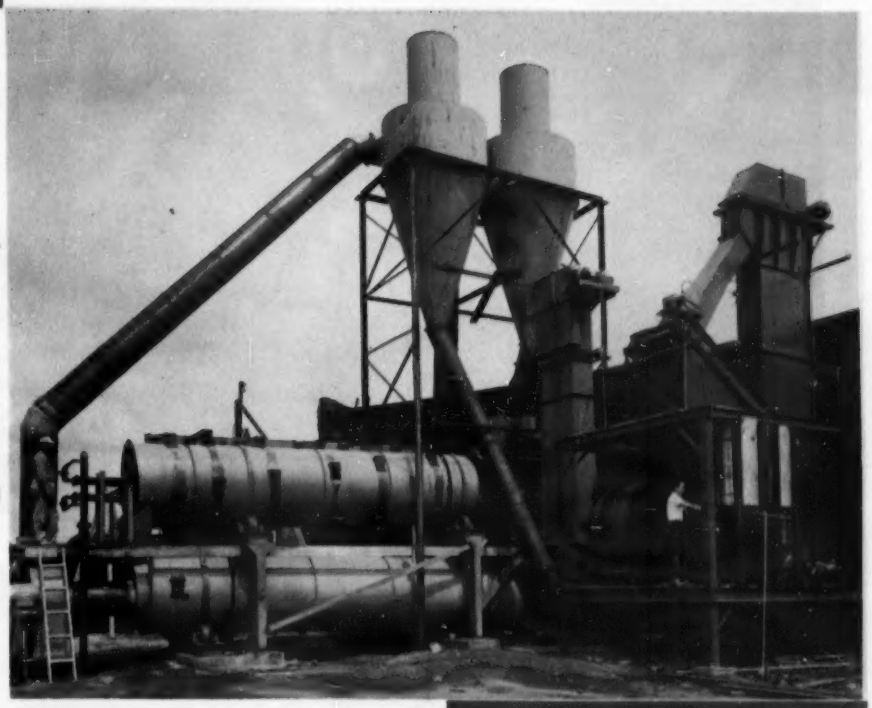

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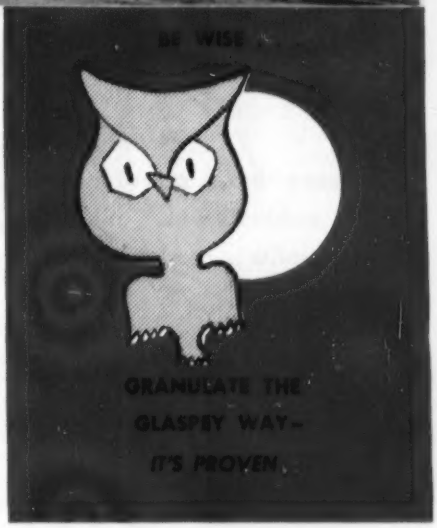

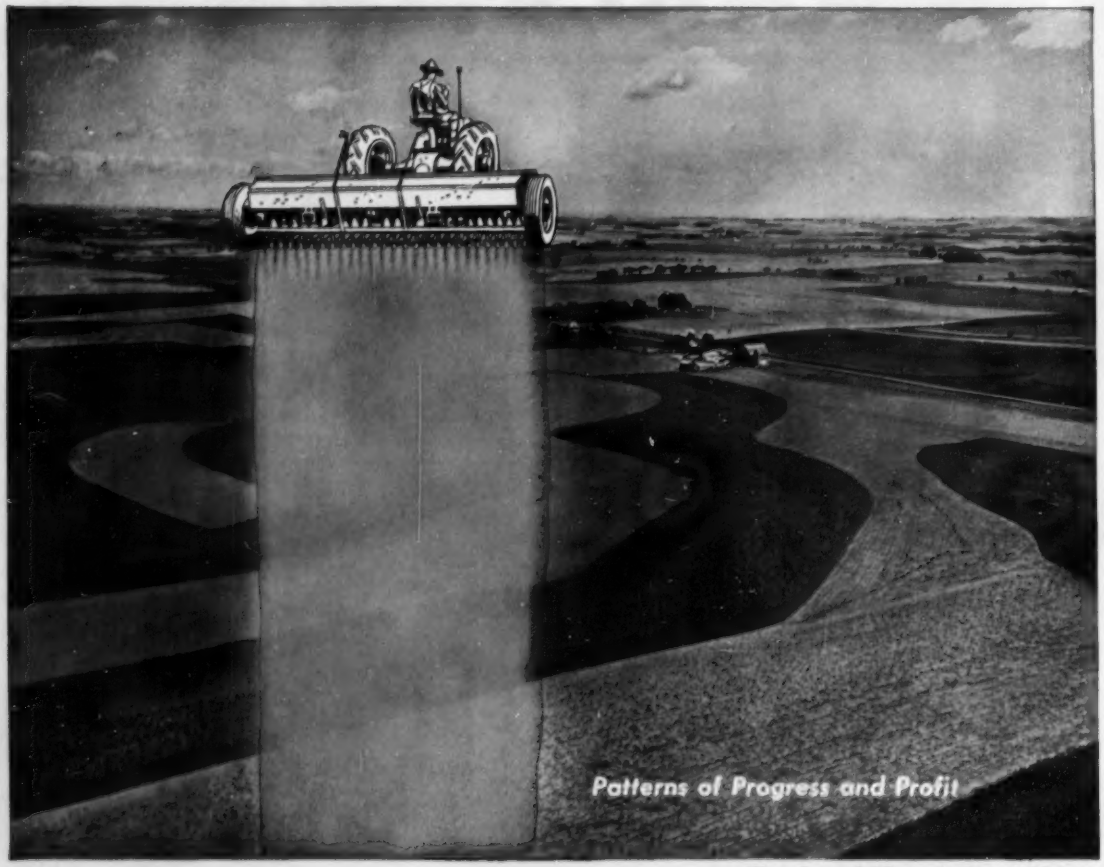

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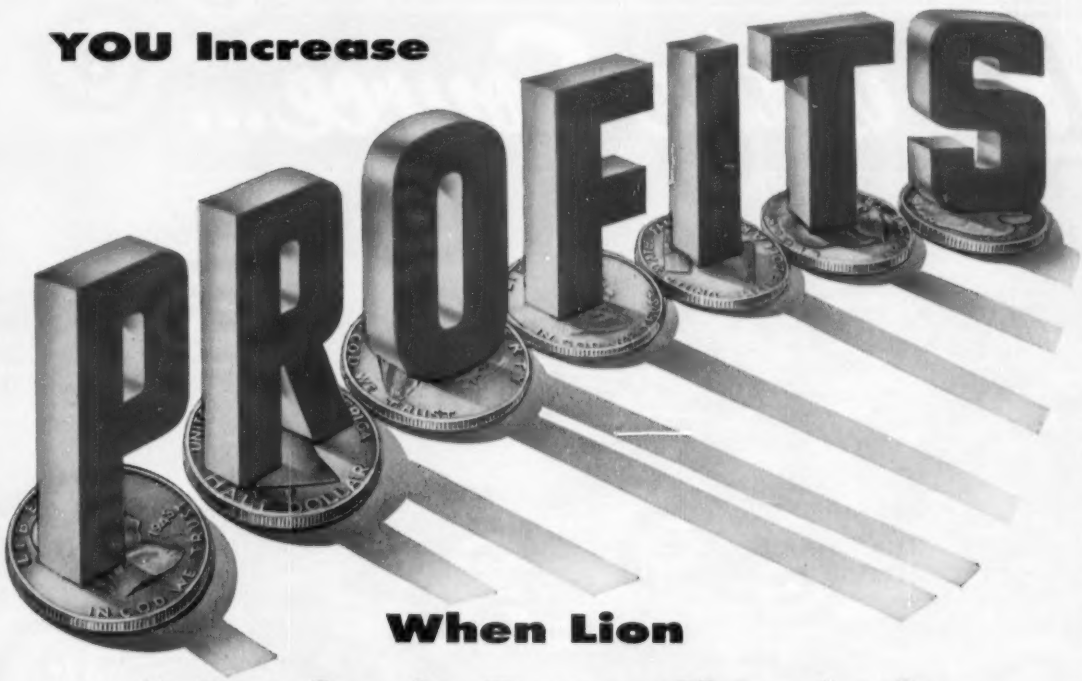

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Lion Anhydrous Ammonia—82.2% nitrogen. Quality guaranteed.

Lion Aqua Ammonia—Ammonia content about 30%—other grades to suit your requirements.

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Lion Nitrogen Fertilizer Solutions—Various types to suit your particular manufacturing needs.

Lion Sulphate of Ammonia—White, uniform, free flowing crystals. Guaranteed 21% nitrogen.

Now that the new fertilizer manufacturing season is in full swing, make sure you realize all the profits your plant can produce. *Where you buy* your raw materials can be vital and now, more than ever before, it pays to buy *your nitrogen needs* from Lion—a leader!

Lion nitrogen products are manufactured under rigid controls to meet exacting specifications—ending the costly production delays that result when ingredients vary in quality from day to day. With Lion products, you produce with maximum efficiency and profit—and you maintain the quality standards your customers demand.

Lion also provides an expert technical staff to assist you in solving difficult formulation and processing problems. And, throughout the year, Lion's sales building advertising tells farmers the plant food story—for your benefit. Lion's leadership in customer service stands out, offering you outstanding opportunities for increased profits—and your best season yet!

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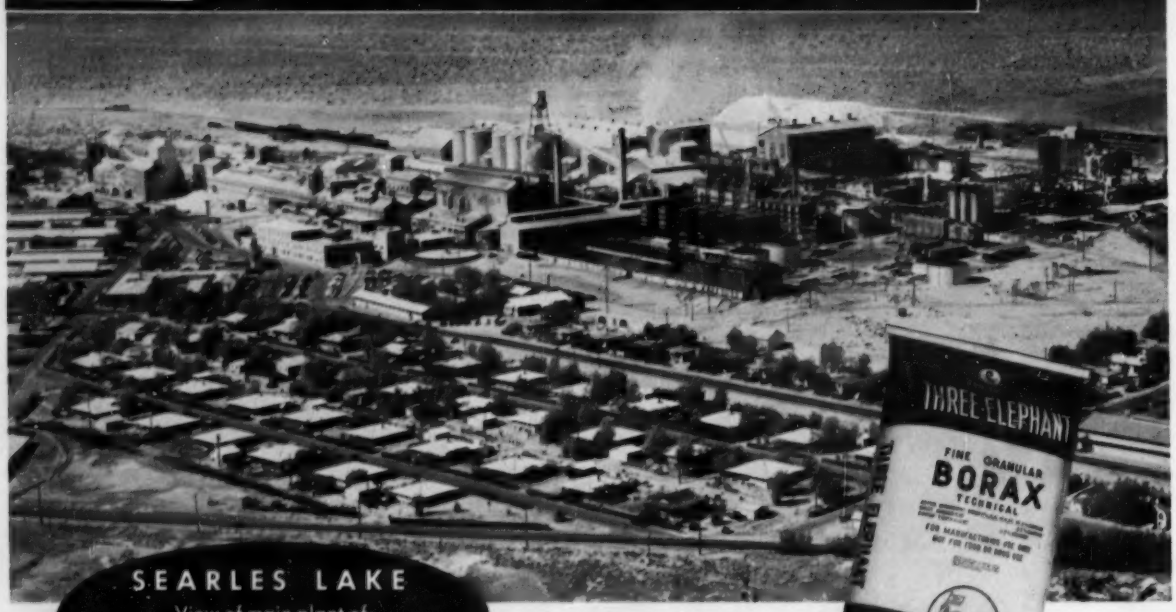

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View of main plant of
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at Searles Lake, Trona, California

and these are the products—

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ANOTHER UNION BAG CONTRIBUTION TO BETTER PACKAGING IN MULTIWALL BAGS

We're saving money through Union's recommendation to eliminate bottom tape

IF YOU ARE NOW CLOSING FILLED BAGS without tape, Union Bag can help you reduce the cost of your Multiwalls.

Successful field tests have demonstrated that the overbound tape can safely be eliminated from the bottom closure to match your top closure.

Union packaging engineers will be glad to study your filling, closing and handling operation without obligation and tell you to what extent you can benefit from a no-bottom-tape-closure Multiwall. You can take advantage of this service even though you are not presently a Union customer.

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Wasteful "buckshot" pouring is eliminated because Zip Top – *with almost* no effort – provides a clean, controlled opening to empty all of its contents. Economy and customer-satisfaction are assured all around.

The new Zip Top feature is added to the other A&S multiwall advantages. You get outstanding colorful designs – clean, sharp printing – specification bag paper supplied by 4 big mills – the best possible combination of research and services. A&S customers are assured the experience and imagination of "the oldest name in paper bags" – almost a century of dynamic packaging and merchandising know-how.

To learn more about Zip Top – and other important special-packaging advantages–address the Package Engineering Department, Canajoharie, New York

A&S

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International's New Triple Superphosphate assures more

complete ammoniation

ONE look shows you why International's new Triple Superphosphate offers such a big advantage in ammoniation. Its improved fineness of texture; uniform, dust-free particles; and correct chemical structure assure maximum ammoniation in minimum time — help cut your manufacturing costs. International's new Triple Super is made by an improved process from high quality rock. Result: a high analysis product (46% A.P.A. or better). Special conditioning before shipment helps prevent setting up en route. This, plus improved particle size, means less grinding before mixing, more economical handling, better texture in your finished products and high product performance. International's new Triple Super is ready for immediate delivery to your plant. Write or wire the Phosphate Chemicals Division for samples and quotations.

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At a Saving of $2.25 a Thousand Bags!

BY J. FRANK GREELEY
Director of Multiwall Paper Bag Sales
Fulton Bag & Cotton Mills

They Had to be Shown. Sifting could make a big profit-and-loss difference in this company's operation. Fulton's new Ful-Flex Non-Sifting Sleeve looked different and promised new economies. They tried it out.

Comparison Showed that Fulton's Ful-Flex Sleeve was of extra size, and made of special flexible paper. They tested it thoroughly. First...

Actual case history in our files—name on request.

They Tested for Sifting on the conveyor belt. Careful scrutiny of the floor area underneath showed no significant sifting had developed. What would happen during shipping? They checked . . .

A Double Check at point of arrival was made. Floor of freight car showed barely perceptible sifting had taken place. Weigh test proved sifting loss had been negligible . . . at a saving of $2.25 a thousand!

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Let's investigate whether Ful-Flex sleeve can solve a problem for you.

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Raymond specializes in reproducing bag designs through our exclusive Kolorseal process which assures you clean, sharp, durable colors which never fail to attract.

Let us send you *proof* of our ability to transform the "wallflower" type of shipping sack into a go-getter of sales. Still better, call in the Raymond man!

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MULTIWALL PAPER SHIPPING SACKS

Safety

FERTILIZER SECTION DRAWS GOOD CROWD AT CHICAGO

Largest and most enthusiastic in the organization's 5-year history was the crowd attending the annual convention of the Fertilizer Section, National Safety Council, at Chicago October 17-18.

A busy two-day meeting was highlighted by business sessions both afternoons, a business luncheon, and a forenoon series of informal "bull sessions" on half a dozen selected safety topics, a well-received innovation in this year's program.

National Plant Food Institute entertained the Safety Section's Executive Committee and speakers at a "kickoff" luncheon on opening day. **Paul T. Truitt,** NPFI executive vice president, explained the Institute's policy toward safety: full support of and cooperation with NSC's Fertilizer Section rather than undertake a separate safety program.

CLARKE OPENS WITH ANNUAL REPORT

General Chairman **Thomas J. Clarke,** controller of Coop. G.L.F. Soil Building Service, Ithaca, N. Y., opened the business meeting with his annual report. There is a tendency in management, he recalled, to look at statistics—which is fine, provided you know what's behind those statistics. Behind the statistics recording the Safety Section's continued growth and progress during the past year were thorough and vigorous jobs on the part of each committee's chairman and members, he explained, naming the committee chairmen and thanking each for his contribution to another successful year. Among the goals met were: a membership increase that placed the Fertilizer Section number one of all Safety Council sections in growth; acceptance of an anhydrous ammonia data sheet, and consideration of a similar sheet for sulfuric acid; development of a new series of visual display posters; completion of the safety motivation study; research projects touching on health, equipment, pre-employment physical exams, lighting, and other important topics; further work on legislation and insurance; a highly-successful safety contest; and continued publication of the popular newsletter. Other committees whose work he cited included: Engineering; Pesticide-Fertilizer Mixtures; and Publicity.

The Section now has members in all 48 states, Canada and Formosa, he summarized, and is compiling data on "building safety into every plant, both new and old." Having acquired full support of the National Plant Food Institute, he concluded, we turn over a "going concern" to the incoming officers who themselves have played a big part in reaching these objectives.

Reporting for the Nominating Committee, Chairman **Vernon S. Gornto** offered a new slate of officers and Executive Committeemen who were elected without dissent. (See separate item in story for names.)

FORESMAN

Max W. Foresman, director of Public and Plant Relations for Spencer Chemical Co. at Kansas City, was introduced by Spencer's **John E. Smith** of Pittsburg, Kans. Speaking on "Safety and Human Relations," he mentioned the technological progress that is bringing us into industrial automation, discussing methods and techniques of improving the human factor in that picture. "Certainly," he emphasized, "our understanding of the men who operate the machines should be able to keep pace with the improvement of the machines themselves."

The safety expert cannot create safety . . . each individual creates either safe or unsafe circumstances for himself. Safety and human relations are not really two separate and distinct subjects; unless we basically believe in the worth and dignity of the individual, we cannot even begin the safety education program.

A safety program will increase the importance of the individual. That in itself is perhaps the most essential ingredient in a human relations program: that the employee believes the company is interested in his welfare.

Eighty percent of all industrial accidents come from commission of unsafe acts, not from lack of protective or safety devices; we cannot protect a man if he refuses to be protected. Safety, therefore, is an attitude which must be motivated with each individual. Human relations being an understanding of attitudes, we need to study the "why" more than the "what" to which we tend to respond generally.

It's not so much "what did he do" as "why did he do it." Frequent causes for accidents are a distaste for the job, a lack of the will to work, dislike of a supervisor, or dislike of fellow employees.

The most essential ingredient in human relations and safety planning is communication; sound communication produces understanding. And sound communication is two-way communication. We must first be able to listen so we can understand what established convictions and attitudes already exist, then we must be able to communicate to influence and change these attitudes.

There is no substitute for face-to-face communication, which involves actions and activities as well as words. The importance of face-to-face communication re-emphasizes our awareness of the supervisor's place in the safety education picture. Without effective communication on this level all other communication media are ineffective.

If we say we feel each individual is important in the eyes of the company, and degrade that individual's dignity with our actions, we have communicated only one fact—and you needn't be reminded which fact gets across.

Each and every one of us demands to feel that he is a member of a group. The sense of belonging is important. And before a man feels he belongs, he must be kept informed about what is going on.

Remember, too, that we accomplish more by praise than by condemnation. And don't forget the home in your communications—motivation is stimulated by Mom and the kids, who have a big stake also in the job. Don't fail to become familiar with attitudes and convictions. Only in this atmosphere can your program be communicated.

Safety and human relations? Safety IS human relations.

LOGAN

"Selling Safety, or Management and Supervision's Part in Loss Prevention" was the topic tackled by **P. W. "Joe" Logan**, division manager, Loss Prevention Dept. of Liberty Mutual Insurance Co., Atlanta. How well you are meeting the accident-prevention needs of your plant depends on you and management—and your supervisors. The supervisor's objective is to get the job done, but his personality largely determines how effectively he does this, and how safely.

Illustrating with slide-projector caricatures and descriptions of foremen of exaggerated personality-types, Mr. Logan showed how each of these traits can be used to advantage—if not used in excess. Good foremen—those who can make the transition from "boss" to leader—are up-graded because they can get production without accidents. Supervision thus involves human engineering—an ability to get people to do the best accepted practice.

And good safety practice demands the 3 Es: engineering, education and enforcement.

For males of all ages, only heart disease and cancer now outstrip accidents as killers; and accidents themselves are responsible for more deaths in the 1 to 37 age group than any other cause. Minor scratches and cuts take a heavy toll through infection—13,833 cases of infection cost 111 deaths, 2150 permanent disabilities and $11,000,000 annually. Unless the worker has the facilities and the desire to treat these minor injuries within 30 minutes, his infection risk is one in a hundred for all industries.

Safety must not be APART from production, Mr. Logan concluded, it must be A PART of production.

REPORT ON MOTIVATION STUDY

Final event on the first day's program was the report on Fertilizer Section's "Employee Motivation Study Project" by **Dr. Charles W. Nelson**, director of Research and Planning at University of Chicago's Industrial Relations Center, who conducted the study. Dr. Nelson first reviewed the objectives of the study: **1.** To obtain information on the learning habits and motivational patterns of the average fertilizer employee. **2.** To appraise the plant's pattern of supervision and determine how each plant's pattern affects employee motivation and safety. **3.** To obtain information about personality traits, etc., that could be used in constructing a check-list for use in selecting non-accident-prones from among job applicants. **4.** To make a "needs analysis" of the social structure of a typical fertilizer plant, showing how the plant's communication channels, career lines, etc., affect employee motivation. **5.** To serve as a guide in management development of future training programs toward the end of greater safety, higher morale and better production.

Outlining his approach and methods, Dr. Nelson played recordings of some of the interviews and discussions to illustrate the points scored in his report. Then he described the methods of analysis used after gathering information for the project.

Among his comments were: "perceive their co-workers as walking extensions of machines"; "interested in technical things"; "work efficiently, and with precautions, because it's to their own advantage to do so"; concerned with concrete and immediate things about the work"; "interested only in those aspects of the work that affect him immediately"; "some job satisfaction from doing technical work, and they take pride in their competence"; "can't do anything beyond the group's standard of minimum improvement without losing their (group) acceptance"; "his formal position in the company is very important to the employee"; "no reason to take on responsibility, or to show initiative in his work"; "very obedient to formal orders . . . carry out an order even when they know it won't work"; "great contempt for the foreman . . . despise him for his lack of technical ability"; "great respect for the superintendent . . . consider him a technical expert . . . who knows what he's doing and has a perfect right to order them around if he likes . . . see the superintendent as the ultimate authority . . . earning his approval is very important."

Citing the four basic types of leadership, Dr. Nelson contrasted the practices employed in the industry with the type of leadership the foremen would like to exercise.

Among his suggestions to management: **1.** Addition of an assistant to the plant superintendent. **2.** Upgrade machine operators over rush employees. **3.** Raise the standards of the foreman.

Motivational devices should emphasize: paternalistic formal authority; technical training and concrete and immediate rewards for job performance; group approval at the employee level.

The Executive Committee will take Dr. Nelson's report and suggestions under advisement, later presenting its formal recommendations to the industry.

In closing the session, Curtis A. Cox, who had acted as program chairman, announced location of various rooms throughout the hotel where morning "bull sessions" on specific safety subjects were to be held under the guidance of participants in the following day's symposium.

1955-56 Officers and Executive Committee
Fertilizer Section, National Safety Council

General Chairman: Curtis A. Cox, Virginia-Carolina Chemical Corp., Richmond, Va.
Vice Chairman: E. O. Burroughs, Jr., F. S. Royster Guano Co., Norfolk, Va.
Secretary: R. G. Diserens, Phillips Chemical Co., Bartlesville, Okla.

Re-elected to Executive Committee:

E. J. Buhner, Buhner Fertilizer Co., Seymour, Ind.
George F. Dietz, Fertilizer Manufacturing Co-op, Baltimore, Md.
Dewey Lange, Lange Bros., St. Louis, Mo.
John S. Mark, American Nitrogen Corp., Huntington, W. Va.
George L. Pelton, Smith Agricultural Chemical Co., Columbus, Ohio.
Harwood T. Rice, Southwest Potash Corp., Carlsbad, N. M.
William A. Stone, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.
C. J. Watts, Jr., Commercial Solvents Corp., Atlanta, Ga.
Roy White, Lion Oil Co., El Dorado, Ark.

Elected to Executive Committee:

W. C. Creel, N. C. Dept. of Labor, Raleigh, N. C.
Earl Day, Ark.-Mo. Plant Food Co., Inc., Corning, Ark.
Yen Shen, Taiwan Fertilizer Co., Ltd., Taiwan (Formosa), China
Stanley S. Schaefer, Wisconsin Farmco Service Cooperative, Madison, Wisc.

INCOMING CHAIRMAN LEADS TUESDAY

The forenoon discussions on Tuesday were for the greater part simply moved from their locations to the luncheon meeting for continuation as formal presentations in the afternoon panel.

Following the luncheon, incoming General Chairman **Curtis A. Cox,** assistant manager of the manufacturing department for Virginia-Carolina Chemical Corp. in Richmond, had some informal remarks:

"In accepting the chairmanship of the Executive Committee of the Fertilizer Section, I do so without any misgivings as to the responsibilities and the tremendous task that lie ahead in our efforts to reduce accidents in the fertilizer industry.

"It seems to me that we are now entering into a new period as related to the functions of the Section. Up until the present time we have been greatly concerned with organizational work within the Section, and although this has been an organizational period, much effective work has been done in the distribution of materials and research which would be helpful in promoting safety programs within the plants.

"Now we are apparently on rather sound footing organization-wise and our efforts will be directed to a great extent toward putting into actualities those plans and programs for which there has been much preparation. It will be our purpose to continue the implementation of the Three-Year Plan, which, in the main, calls for a Safety Training Program in the fertilizer industry at various locations in the country during the year 1956. Actually we have in mind at the present time only one such training school, to be held more or less on a trial basis; and should there be enough interest in this type of program, needless to say other such schools will be held for the training of personnel in the industry.

"Much has been done to create an atmosphere of safety consciousness in the industry . . . and unless we are able to induce an atmosphere of safety consciousness, our other efforts have been in vain.

"I think one thing that makes this work so challenging is the fact that we are, in the final analysis, working with people, attempting to protect them against undue physical suffering and other economic losses attending a lost-time accident. I am reminded of the statement someone has made that human beings do not react logically to life; they react pyschologically. Accidents caused by human failure are really symptoms of psychological maladjustment to the work situation.

We must continue our efforts to improve our organization and at the same time redouble our efforts to effect a substantial decrease in the number of accidents occurring in the fertilizer industry."

PHILLIPS

The new general chairman then asked Vernon Gornto to introduce the featured luncheon Speaker, **B. J. Phillips,** personnel and safety director of Coronet Phosphate Co., Plant City, Fla.

Following the theme "Is Safety First?", Mr. Phillips first scored the point that safety has had to take a back seat to production and costs, and that safety proposals are often postponed until a more "opportune" time.

Developing the idea that safety should be first, he established that through insurance premium rates lack of safety is actually an appreciable production cost. Accident elimination increases efficiency, morale and enthusiasm, he continued, which in turn is reflected in increased production and better labor relations—both of which are measurable benefits. Next he pointed to industry's responsibility to society, and to the human aspects of the safety director's (and management's) job.

Successful accident prevention, he continued, is based on several fundamentals that must be accepted by management, and—once adopted—"continually emphasized and filtered down from the top of the organization to every level. . . The degree of success is dependent on the degree to which the principles are sincerely accepted and actively promoted by management."

Mr. Phillip's principles included: **1.** Sincere desire by management. **2.** Participation so evident that it leaves no doubt of management's attitude. **3.** Money must be spent to provide safeguards, plan and design safe processes, and to staff a safety organization to assist line supervisors. **4.** Acceptance of safety as a necessary part of the production process **5.** Acceptance of safety direction on the same plane with other staff functions and personnel.

Next he discussed development and training of the employee toward the safety goal. The human element, he emphasized, "takes longer to develop and is easier to destroy than any other part of an accident prevention program." Modern industry must coordinate machines, materials and men, he stressed". Machines and materials can be controlled within close tolerance. They react uniformly to the application of fundamental principles. Men do not."

"We need to dig deeper into the assignable causes of variation in human motivation," he continued, ". . . as the value of the dollar has been reduced, so has the value of financial incentives been reduced . . . human treatment and dignity are more important. . . . Happy workers are good producers, and are usually actively interested in Safety."

Safety men, as must everyone dealing with people, need to know not only their specialty but also the art of persuading people, said Mr. Phillips, for the "commanding and forbidding" technique works only within certain limits and employees regard your rules and regulations as a "sort of nuisance that must be tolerated." On the other hand, if you can persuade people that rules are wise and to their advantage, and that the right way is the easy way they will want to live within the spirit of the rules.

"In order to have a successful safety program, this 'public relations' program must be carried a step further to the line supervisors who are in every day contact with the employees and are enforcing the rules and regulations once they are made." All levels of management must be public-relations-conscious.

"We live in an age of science. One of the techniques of science is to reduce descriptions to formulas . . . when we are dealing with people, formulas do not work . . . it is not usually possible to keep any condition constant or controlled . . . we cannot hope for a formula to tell us how to persuade and influence people. This is an art rather than a science."

Unless we do "realize the human element, strive to point this up to our supervisors in order for them to enforce our safety rules and regulations, and in return obtain enthusiastic cooperation from the rank and file instead of a resentful or passive attitude, we will not be able to reach our goal of 'safety first' in industry."

Vernon Gornto interrupted the program at this point just long

enough to pay tribute to the retiring general chairman, Tom Clarke, and to present him with a citation from the Council.

Then came the afternoon program, after a brief recess, a symposium on "Safety Musts," with Curtis Cox moderating the panel of seven experts, each of whom covered a special phase of safety.

MACDONALD

Duncan MacDonald, safety engineer for Anaconda Co., Anaconda, Mont., led off with "Mechanical Guards."

Since it can be statistically demonstrated that a great majority of accidents are the direct result of human failures, this is sometimes used by plant supervisors as an argument against the safety director's suggestion for guarding equipment.

Understanding the basic difference between ACCIDENT CAUSE and ACCIDENT SOURCE will aid in overcoming the idea that most accidents are caused through human failures. It can also be demonstrated that machines are the source of 10% of injuries resulting in fatalities and permanent total disabilities, and 25% of the injuries resulting in total partial disabilities.

Most of the accidents traced to the machinery source can be controlled by installation of adequate guards. Good, safe guarding equipment is positive accident prevention in that it completely eliminates the chance of human failure causing an injury by contact with moving parts of the machine.

It should be thoroughly understood that a guard must be effective to be good and that if it isn't good it shouldn't be in existence. In discussions the definition for a guard is usually omitted, and left to supervision or safety directors to interpret the meaning of "proper guard". This will vary greatly, depending upon the application of the guard and the type of machinery to be guarded.

Webster says a guard is a mechanical device used to protect one from danger, but a safety engineer might call it "a device used to cover a hazardous part of a machine in such a manner that no employe can be injured . . . even though he be a victim of human failures."

An ineffective guard often makes the original hazard more dangerous by creating in the mind of the operator a false sense of security.

Here are some of the requirements for a good guard: **1.** Must effectively protect employees from a pre-existing hazard. **2.** Must be sufficiently substantial so that if the guarded part breaks, the fragments will be contained within the guard (except flywheel guards which cannot be so constructed). **3.** Must not induce any new hazards of its own (as sharp corners, tripping hazards, striking hazards, etc.). **4.** Must not interfere with proper or legitimate operation of the machine. **5.** Must be so designed as to permit normal everyday maintenance operation, as oiling and greasing, without removal of guard. **6.** Must not obstruct control of machine. **7.** Must be made removable for major maintenance; when disassembled it should not be too difficult to reassemble; insofar as possible, there should be no small removable parts. **8.** Must not weaken the construction of the machine; in affixing guard to machine, no part of critical strength should be disturbed. **9.** Should be made perferable of sheet, perforated or expanded metal. **10.** Whenever possible, new equipment should be purchased with correct mechanical guards in place.

Installation of new guards, repair and upkeep of present guards and replacing of guards after repairs is the responsibility of supervisors.

Recalling some of the unpleasant accident scenes around machinery, Mr. MacDonald brought to the audience's minds vividly the need for guards—then concluded his phase of the program with a demonstration of guards on hazardous points of actual working models of many pieces of machinery familiar to fertilizer plants: a rotary cylinder that could be a cooler or dryer; belt conveyors; a trough-type screw conveyor; and blowers. These scale working models, protected with sturdy removable guards at critical points, drew a great deal of attention during his talk and after the panel, when the display was crowded for some time by interested observers.

DISERENS

R. G. "Bogey" Diserens, safety director for Phillips Chemical Co., Bartlesville, Okla., followed with a study of safety precautions for "Conveying Devices."

As the Fertilizer Industry continues to grow, the need for moving materials keeps pace. The industry is continually striving to increase the quality and quantity of its products. It is obvious that quantity has outgrown materials handling equipment and we find that conveying equipment is obsolete, worn out, and badly overloaded in many instances within industry.

Large sums of money are spent to improve the efficiency of a plant to increase production, but seldom do we spend much money on conveying equipment. We must face the fact that to have an efficient plant, we must have efficient conveying equipment, which is a definite part of our operations and deserves the same degree of attention as operating equipment both from a safety and maintenance standpoint. Improperly maintained and makeshift equipment definitely contributes to the frequency of conveying accidents.

We often find that in order to handle more product, our conveying equipment has been speeded up and is seriously overloaded. Any equipment running over design will soon deteriorate and require extensive maintenance. At the same time, safety problems become prevalent. Conveying equipment is an integral part of operations and your plant efficiency is no better than your conveying equipment.

Technically, conveying would include all forms of transportation such as trucks, trains, cranes, drag lines, Payloaders, forklifts, and numerous other mobile equipment, but we will confine our remarks to stationary conveyors such as belt, screw, bucket, etc.

Numerous conveying safety hazards can be eliminated in the design stages by the safety people working with the design engineer. Safety people should check the design for items such as guards, walkways, oil fittings, pinch points, location of start and stop switches, and other sources of potential accidents. Guards should be of heavy material so as to eliminate the possibility of becoming bent and distorted to such an extent that they will not fit. When a guard does not fit readily, it provides a good excuse for leaving it off.

It is possible to extend grease fittings so that the oiler can grease the equipment without reaching over or under the moving equipment. In some instances, it is necessary to install walkways along the conveying equipment in order to make the equipment accessible for repairs. It is good practice to install guard rails and toe boards on all walkways.

On electrically driven equipment, the master switch should be located so as to be readily accessible for locking-out procedures. Where you have two or more independently driven sections of conveying equipment, they should be interlocked so

CF STAFF PICTURES AT SAFETY MEET

1—New Safety Section officers for 1955-56: Secretary R. G. "Bogey" Diserens, Safety Director of Phillips Chemical Co., Bartlesville, General Chairman, Curtis A. Cox, asst. manager of Manufacturing Dept., Virginia-Carolina Chemical Corp., Richmond, Vice Chairman Ed O. Burroughs, Jr., manager of Insurance Dept., F. S. Royster Guano Co., Norfolk.

2—Immediate past General Chairman, Vernon Gornto of Smith-Douglass Co., Inc., Norfolk, presents Safety Section citation award to retiring General Chairman Tom Clarke of Coop. G.L.F. Soil Building Service, Ithaca.

3—D. Lydy, Safety Engineer for Goodrich Gulf Chemicals, Port Neches, Texas, and A. B. Pettit, Davison Chemical Co., Baltimore.

4—Dick Bennett of Farm Fertilizers, Omaha, and Fred Courtenay of Federal Chemical Co., Louisville.

5—Duncan MacDonald, Safety Engineer of the Anaconda Co., Anaconda, Mont., brought along this beautiful set of working models of plant equipment with removable mechanical guards installed on all hazardous sections.

6—Vernon Gornto, Smith-Douglass Co., Inc., Norfolk, and G. O. McMillin, Northwest Coop. Mills, St. Paul.

7—Tom Clarke of Coop. G.L.F. Soil Building Service, Ithaca and Bob Kelly, Swift & Co., Plant Food Div., Chicago.

8—Earl F. Cline and George Pelton of Smith Agricultural Chemical Co., Columbus, Ohio.

9—Mr. & Mrs. B. J. Phillips, Coronet Phos. Co., Plant City, Fla., retiring General Chairman Tom Clarke, Coop. G.L.F. Soil Building Service, Ithaca, George F. Dietz, Fertilizer Mfg. Coop., Baltimore.

10—Ralph D. Chamberlin, Coop. Farm Chemicals Assn., and J. P. Huckaby, Southern Fertilizer & Chemical Co., Roebuck, S. C.

11—Paul T. Truitt, Exec. vice president National Plant Food Institute, Washington, and John C. Kato, National Safety Council, Chicago.

12—Bill Stone, Wilson & Toomer Fertilizer Co., Jacksonville, Fla., and George F. Dietz, Fertilizer Mfg. Coop., Baltimore.

13—Tom Clarke, Coop. G.L.F. Soil Building Service, Ithaca, N. Y., Jack Stolar and Thomas O'Brien, both with Northwest Cooperative Mills.

14—Charlie McDaniel, Lion Oil Co., El Dorado, Ark., Clyde M. Phinney, Jr., Sohio Chemical Co., Lima, Ohio, Eugene Sprague, U. S. Industrial Chemical Co., Tuscola, Ill.

15—William J. Camp, Quentin S. Lee and A. E. Lord of Cotton Producers Assn., Atlanta.

16—J. Larry Shopen, Consumers Cooperative Assn., Kansas City, and Dr. Charles W. Nelson, University of Chicago.

17—Willis Smith, Illinois Farm Supply, Chicago, and Elton B. Davis, Swift & Co., Greenville, Ohio.

18—R. G. Diserens, Phillips Chemical Co., Bartlesville, Okla., Charles T. Harding, Virginia-Carolina Chemical Corp., Richmond, F. Wayne High, Baugh & Sons Co., Baltimore, J. A. Baker, Phillips Chemical Co., Bartlesville, Okla.

19—John C. Kato, National Safety Council, Chicago, John Smith and Max Foresman of Spencer Chemical Co., Kansas City.

20—W. C. Creel, Safety Director, N. C. Dept. of Labor, Raleigh, Curtis A. Cox, Virginia-Carolina Chemical Corp., Richmond, Ed O. Burroughs, Jr., F. S. Royster Guano Co., Norfolk.

21—P. W. "Joe" Logan, Manager of Loss Prevention Dept., Liberty Mutual Insurance Co., Atlanta, and Mike Ellison, Mississippi Chemical Co., Yazoo City, Miss.

that when one section is shut down, all sections preceding will be automatically shut down. This eliminates pile-up of material. Interlocking conveying equipment should not have one central control panel that will permit starting of all sections from one point unless every section is in view of the operator. Careful study must be made when installing interlocking systems in order to prevent the possibility of accidents due to the indiscriminate starting of equipment. This can happen when all equipment is started from one central location.

Some installations are so installed that the operator must go from section to section in order to start the equipment. By using this method, the operator can see the equipment and thus eliminate the fallacy of assuming that all other employees

are in the clear. Emergency shutdown switches should be located strategically so that equipment can be shut down immediately should some employee become entangled in the machinery.

When repairs are to be made, there should be some method of being sure the equipment is not started until the repairs have been completed. The two methods most frequently used on electrically driven equipment are the lockout and tagging procedures. When using the lockout method, the master switch is pulled and locked out with the foreman in charge of repairs or the maintenance man doing the work in possession of the key. When the repairs have been completed, the foreman or maintenance man removes the lock, thus turning the equipment over to operation.

When using the tagging system, signed tags are used in place of padlocks. When more than one craft, such as welders, mechanics, and electricians, are working, multiple locks or tags are used. Each craft must respect the other craft's lock or tag in order to make these methods successful. We might add that when doing extensive repairs, some plants disconnect the electric wire from the motor.

Whistles and horns are sometimes used to signal the starting of equipment. However, due to the loud noise, employees often make these devices inoperative by attempting to mute them.

Rigid rules should be made and enforced that employees are not to be permitted to ride on conveyors.

Accumulation of materials on the drums and tail pulleys should not be removed while equipment is running. To prevent employees from attempting this, some plants extend heavy mesh guards out from the pulleys several feet.

Crossovers or walkways should be installed to prevent employees from climbing over conveyors.

Several of the hazards found when operating belt conveyors are also present when operating screw conveyors. Quite often we find that the screw conveyor is driven with a chain or sprocket. These chains or sprockets should certainly be properly guarded. One of the most hazardous situations arises when some employee removes a part of the conveyor covering to work on the equipment and fails to put the cover in place. This possibility of injury can be eliminated providing it is a rigid rule that the equipment is not to be started until all covers and guards are in place.

Bucket conveyors are usually enclosed; however, keeping the inspection doors in place presents a problem, and can best be done by making frequent inspections. The gears and drives should be guarded the same as all other types of conveyors.

COURTENAY

"Fire Protection" was the topic handled by **Fred H. Courtenay,** Secretary of Federal Chemical Co., Louisville. Citing daily losses at 33 deaths in 5500 fires causing $3,000,000 damage, he recalled some of the fires and losses experienced by his own company.

Pointing to the "salamander" heater as probably one of the worst hazards, he described how one of their plants had experimented and finally came up with a device that is just as effective, yet much safer for use in an open plant: a regular gas burner inside an iron stove, which proves also more economical to operate and requires less frequent replacement.

Electricity, however, has been responsible for more fires—both large and small—Mr. Courtenay continued, and archaic wiring set-ups at many fertilizer plants prevent precautions from being taken, even when an emergency situation is detected and a fire appears imminent without quick action.

One lesson Federal Chemical has learned from an elevator starting box fire, he said, is that extinguishers can be placed too close to a potential fire source; in this case the fire (which originated in the starter 25 minutes after a shutdown for lunch) produced such intense heat that even after the main switch was thrown (fuses and circuit breaker having failed to operate), men were unable to reach the carbon dioxide extinguishers located 10 feet from the starting box. As a result, extinguishers are now located 20 feet away from potential fire sources.

As for extension cords and lamps, another danger point, Mr. Courtenay suggested cage guards and switches at the socket end. Remnants of organic matter in hoppers are another hazard he illustrated by describing a fire and injury that occurred when organic conditioner dust flashed at heat from an acetylene torch being used in repairing an overhead ingredient hopper.

Citing some recent experiments, he declared that ammonium nitrate will not reach its temperature of explosion (4500° C.) without external pressures of about 20 atmospheres; all instances of its explosion from heat of fire have happened in ships where heat and products of decomposition were confined to create this situation, he reminded. As further illustration, he told how a recent fire brigade training course in Louisville demonstrated with an aluminum plate of pulverized ammonium nitrate over an open fire; glowing coals were also dropped into the melted, fuming ammonium nitrate but still no flame appeared. The mass was then extinguished by spraying with one of our standard ammoniating solution containing ammonium nitrate.

Of fires involving ammonium nitrate he characterized the chief danger as decomposition giving off free oxygen that intensifies the fire. No fires, outside the ships, involving this material have been caused by spontaneous heating of the nitrate and none resulted in explosion; the only recorded case of fire originating in or near ammonium nitrate, he recalled, was in a mixture of the nitrate with organic materials and uncured superphosphate.

As for material dangers Mr. Courtenay cautioned against organics stored in bulk or with uncured superphosphate, as they are susceptible to spontaneous combustion.

Sprinkler systems are execellent protectors, he advised, for in 50 fertilizer plant fires where sprinkler systems had been installed, 46 were either extinguished or held in check —and in the other four cases the sprinkler equipment was not functioning properly.

After discussing effectiveness and limitations of various portable extinguishers, Mr. Courtenay concluded by recommending that plant management call in the local fire chief for his advice, describing a brigade training course that had been arranged for representatives of fertilizer plants in the Louisville area.

MCDANIEL

Next came **Charles L. McDaniel,** technical service supervisor of the Chemical Sales Division, Lion Oil Co., El Dorado, Ark., with some expert on "Liquid Nitrogen," or "Liquid Nitrogenous Fertilizers" as he more properly phrased it.

Safety and handling information is available from the technical service department of most nitrogen producers, he explained, simply for the asking—and is one of the few good things that are still free.

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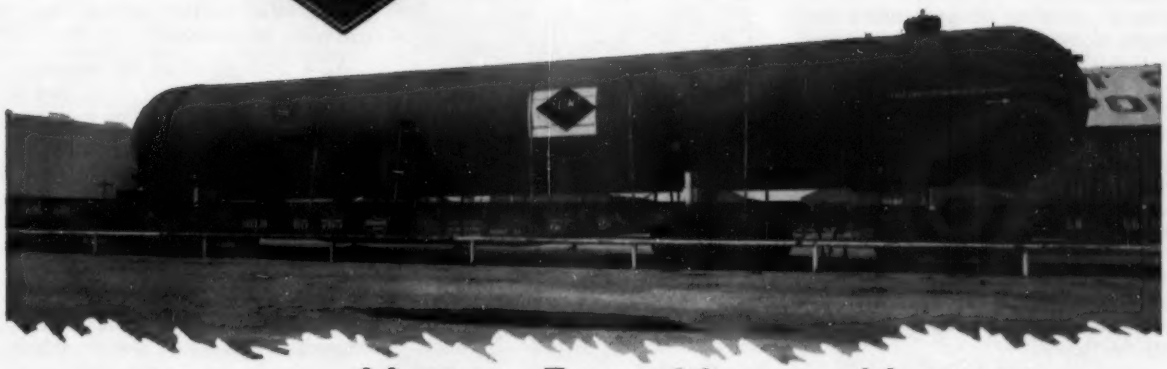

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As additional sources of good information on this broad field, he recommended chemical safety charts on anhydrous ammonia, aqueous ammonia, sulphuric acid and nitric acid available from the Bureau of Labor Standards; National Safety Council's Safety Sheet on anhydrous ammonia; Manufacturing Chemists Association's publications on anhydrous ammonia, aqua ammonia and proper handling of ammonium nitrate; Compressed Gas Association's pamphlet on anhydrous ammonia; and the Department of Agriculture library's bibliofilm and reprint service for photoprints of published technical and scientific articles. Also, he said, there are many commercially-sponsored brochures to be had for the asking. (Complete information on obtaining any of the literature specifically mentioned can be had by dropping a note or card to Commercial Fertilizer magazine—or to Mr. McDaniel)

Describing the phenomenon of short-duration (1/100 sec. approx.) flash fires noted in some of the many rotary TVA-type ammoniators now used in the industry where concentrated sulfuric acid, anhydrous ammonia and nitrogen solutions are introduced beneath a bed of dry materials, he explained what is believed to be happening and how it has been avoided in the cases discovered. This process, which involves production of sulfate of ammonia in the ammoniator, was originally planned around the use of 93% sulfuric acid; however, he continued, some plants have—in order to produce a drier product—reduced the introduction of liquids by using 98% acid instead of the 93%. The more concentrated acid and the anhydrous ammonia both have an extreme drying on the bed of materials.

Also, some nitric acid is produced in the process, which—coming into contact with the sulfuric acid—forms some amount of nitrogen pentoxide, an unstable compound that is a powerful oxidizer; this nitrogen pentoxide sometimes reacts with the anhydrous ammonia for a vigorous reaction, believed to be the cause of the short-duration flash fire. However, he expressed the opinion that the phenomenon could be avoided even with the use of the 98% acid if more complete dispersion of the liquid agents into the dry mass could be effected.

Mr. McDaniel also expressed concern over the number of second-hand steel tanks and new tanks of small-gauge steel being purchased for handling aqueous ammonia—especially at the small liquid fertilizer mixing plants. He recalled some recent findings on ignition of wet ammonia-air fumes, especially at lower temperatures and also in the presence of minute quantities of oxides. Some research, he noted, had indicated a flame front could be transmitted from one of these tanks to another through 2-inch piping.

Citing some recent experiences with tank inspection and repair, Mr. McDaniel concluded by urging a storage tank interval inspection annually—and every possible precaution in the repair of tanks, with replacement instead of repair if there is any doubt as to the safe outcome of the repair.

HENRY

Robert P. "Pat" Henry of the Agricultural Dept., Willson Products, Inc., Reading, Pa., was the next panelist, speaking on "Fertilizer-Insecticide Mixing Problems." These problems are very much on the increase, he showed, not only because of the increase in sales of the mixtures, but because insecticides are becoming more potent and more toxic.

Protection of plant personnel is a very important consideration, he stated, for smaller doses of the materials repeated daily have a cumulative effect, acting on humans in the same manner as they do on insects.

A study of occupational diseases resulting from agricultural chemicals in California in 1954 covered 391 cases, he related, and 47% of them were classified as lost-time accidents. Of the total, 53% represented skin irritations and 47% were systemic in nature.

Atmospheric hazards can be drastically reduced, he continued, by installation of dust collection equipment along with high ceilings and adequate ventilation. Many in-plant problems are simply a matter of proper clothing, properly worn, he stressed, since special equipment is required generally only when directly handling the compounds. Shower facilities are indispensable for all employees to remove all traces of the materials which sift in through protective or ordinary clothing. Eating and smoking in the contaminated areas, or before removing all traces of the compounds, must be prohibited.

For those employees working in the immediate area eyes must be protected — preferably with indirectly-ventilated dust goggles, he explained, while individual respirators, of a type recommended for the particular material being handled, should protect the nose and mouth, since compounds introduced through the nose and mouth act more swiftly and with more damaging effect. Also, he pointed out, no employee should be exposed for extended periods—and regular medical check-ups must be enforced.

As a final warning, he reminded that the manufacturer also has a keen responsibility toward the user. Not only by labeling in accordance with the requirements of law, but in assurance of a clear, complete and adequate warning.

WAUGH

"Safety Rules" was the subject covered by **Albert A. Waugh**, safety supervisor for the Florida Division of International Minerals & Chemical Corp. at Bartow. In outlining the use of safety rules in an accident prevention program, he described how their "On the Green Beam" safety manual was developed, and what the program had accomplished.

"The Safety Rules or Standards which we published were for the purpose of making our Division a safer place for men to work" he stated, "We believed it would serve as an instruction book to our new men and to those old timers who were more experienced. We knew that there would be short-comings and realized that it would be impossible to make a set rule for every possible occasion. Consequently, we found it necessary to make certain revisions from time to time as the need arose or as we received suggestions. Revisions, however, were not too frequent.

"In years gone by we had some bitter experience with numerous types of accidents. Records were kept of every accident by type and cause, and, consequently, when we sat down to write these rules, which we now have in effect, we broke down every accident that we had had in a period of 7 years by cause and attempted to write a rule covering that cause to prevent a recurrence.

"We felt that our safety rules could only be made mandatory if we could convince all our employees that what we really wanted was to reduce accidents and prevent injuries to our men. We stressed the fact that our Management was real-

ly interested in the health and safety of the men in that we would do as much as we possibly could to make both the work place and the employees as safe as was humanly possible.

"By convincing the man that he is the one to suffer physically and financially should he have an accident—we believe that enforcement can be improved and really understood. We must reach into the consciousness of the employee to the point where accident prevention rules are not only understood but are believed, studied, followed and then, if necessary, enforced.

Our experience has taught us that too many people are blind to the hazards of their jobs. They fail to anticipate the dangers of a task and often engage in poor practices to get the job done.

"Discussion can be held with the men when an accident occurs, regarding what was wrong, how the accident could have been prevented and then we must make sure that we are understood by the men, but bear in mind that these discussions alone will not prevent the accidents. Certainly they will reduce the accidents to a minimum.

"When men are seen working unsafely or making mistakes in their methods, they are noted and the specific rule governing that particular job is explained to each man. Too often the foreman or safety man can be misinterpreted, so we must make sure that the man understands and is convinced. Maybe we have too many 'don't' rules, and by that I mean they forbid an action but don't explain why. Here is where we depend on our supervisors to explain the safety rule by telling why, and how such an idea got into the rules.

"Now of primary importance is the unsafe practice, or where the employee thinks his method is better and quicker. We feel that if a poor practice is noted and properly corrected on the spot and the information passed on to other departments, a lot will be done to prevent accidents.

You can't mine, get out a low cost product for a highly competitive market unless you incorporate safety with your operations. We feel that there shall never be a let up in our drive to prevent accidents.

"We are probably like most other organizations in that our injuries come because men do not understand. We try to teach them to anticipate hazards, and if we have failed to sell them on a safe practice then we know that we must try again because we have apparently failed to make ourselves clearly understood.

We expect our supervisors to be responsible for the safety and well-being of the men under their control. This responsibility includes not only safety, plant house keeping, fire prevention and sanitation but other related working conditions as well. In doing his job properly, the supervisor should be friendly with his men but at the same time firm in his instructions relative to the following of our safety rules.

"Now at some of our locations certain jobs must be done in a certain way. Here we find it necessary for a complete job analysis, incorporating the accident experiences of the past and then using these suggestions in a group meeting with the men. Old and new, or right and wrong, methods must be studied, reviewed and corrected.

"When new men are hired in our division they are given a half-hour safety talk along with a demonstration of our "robot" on the proper method of lifting. They are, also, given a copy of our safety manual and the rules explained. We try never to place a new man with an unsafe worker, or shall we say accident prone individual. We feel that if we put this new man with the old unsafe worker then we will soon have two unsafe workers rather than one.

"Our Management accepts full and definite responsibility and applies a good share of its attention to the task of preventing injuries just as it does to any other undertaking of vital importance. They feel that prevention must be given continuous attention along with such matters as costs, quality, and production.

"The most important fundamentals for which our Management assumes responsibility in order to achieve adequate safety performance and to prevent accidents may be summarized as follows: **(A)** It makes crystal clear to all supervisors that top Management is behind our safety program and that every supervisor is held accountable in making certain that all safety rules are adhered to. This policy is clearly set forth in writing and is brought to the attention of everyone. **(B)** Provides a safe and healthful place in which to work including: **1.** Safe equipment and tools. **2.** Safe guarded machinery. New machines are guarded before they are installed. **3.** Processes and operations planned and arranged with careful and constant attention to safety. **4.** An inspection system to discover and correct all hazards. **5.** Last but not least, the absolute backing of the safety rules as a **must.**

"My remarks have been merely 'guide-posts'—they cannot give you the intelligence, the interest or the desire to do a better job than you have done before. As we accomplish our purpose we will be living up to the promise of safety and it will really mean the promise of the right of man to live, to grow and to exercise his freedom and to partake of the good things of life.

LYDY

Final panelist was **D. Lydy,** safety engineer for Goodrich-Gulf Chemicals, Inc., of Port Neches, Texas, who covered "Electrical Hazards." Reminding that 110-volt current can electrocute, and that it takes only 50 to 90 milliamperes (the amount of current required to light a 5- to 10-watt lamp) to kill, he reviewed some industrial electrical hazards.

Devoting most of his attention to portable tools and extension cords, he recommended inspection of even new tools and a frequent check-up afterwards. Cord protectors, he demonstrated, can take a big strain off a danger point—the junction of the cord with the tool shell.

Explosion - proof lamps (vapor - proof) are an excellent investment for any plant, he pointed out, and separate grounding of surfaces subjected to corrosion are a wise precaution.

Outside contractors working in the plant must be carefully supervised, Mr. Lydy cautioned; also substandard equipment and circuits should be eliminated and others subjected to frequent examination. In hazardous areas where sealed electrical equipment is employed, he warned that only sealing compounds made or recommended by the equipment manufacturer should be used.

In closing, Mr. Lydy advised that any manufacturer selling to any branch of the government should review provisions of the Walsh-Healy act (copies of which may be obtained at 10¢ each from the Superintendent of Documents, Washington 25, D. C.).

At the end of the formal talks, the floor was opened to questions and discussion before Curtis Cox "rang down the curtain" on the convention.

225 ATTEND *Midwest Soils* MEETING

With attendance exceeding 225, Middle West Soil Improvement Committee held its 17th annual meeting October 27, at the Sherman Hotel in Chicago.

Representatives of more than 70 fertilizer firms and associated organizations from the corn belt and other sections were present.

Plans were outlined for expanded educational activities to help promote greater fertilizer use, and full reports were given on the Committee's activities in process at the present time.

W. M. Newman, of Price Chemical Co., Louisville, Ky., was elected president for the 1955-56 term. Other officers named were Richard E. Bennett of Farm Fertilizers, Omaha, Nebr., vice president, and George H. Kingsbury of Kingsbury & Co., Indianapolis, Ind., treasurer.

Directors chosen for a 3-year term were: J. D. Stewart, Jr., Federal Chemical Co., Louisville, Ky ; Robert A. Weis, Virginia-Carolina Co., St. Louis, Mo.; L. E. Quiram, Illinois Farm Supply Co., Chicago; and E. T. Potterton, International Minerals & Chemical Corp., Chicago Heights, Ill.

On the early agenda of the business meeting were reports by MWSIC Treasurer, R. G. Fitzgerald, of Smith-Douglass Co., Inc., Streator, Ill.; and H. E. Wood, of Farmers Fertilizer Co., Columbus, Ohio, chairman of the audit committee.

Members approved a budget for 1955-1956 educational activities.

President Newman then called on Z. H. Beers, MWSIC executive secretary for his annual report summarizing the committee's 1954-55 program and detailing plans for new activities in 1956.

Mr. Beers reported an increasing acceptance among 1,750 daily and weekly newspapers of the committee's illustrated and unillustrated articles. He said that more than 280 Corn Belt radio stations have requested MWSIC scripts for weekly farm program broadcasts; also that 18 live or transcribed programs dealing with fertilizer's value in profitable crop production had been scheduled during the year.

National, regional and state farm magazines are making increased use of special articles prepared by the MWSIC staff. Fertilizer industry publications have cooperated generously in carrying news of the committee's activities, Beers said.

More than 200,000 copies have already been distributed of a new MWSIC folder entitled "You Can Grow Profitable Corn This Year," he reported. Of these, fertilizer companies have distributed 100,000 to dealers and farmer customers. More than 2,000 schools are using 75,000 copies of the folder in vocational agriculture classes, and 1,500 extension agents in every county in the 13 MWSIC states are using the folder in their contacts with farmers.

Mr. Beers reported increased fertilizer research at Midwestern agricultural colleges and experiment stations under MWSIC - sponsored grants-in-aid.

Now in work or soon to be released, he said, are two new color film strips. One is on band-seeding of legumes and the other on alfalfa production. On the schedule, too, are film strips on corn, wheat and small grains, and soil testing.

Looking ahead, Mr. Beers cited the need for an on-the-farm educational program involving "See-for-Yourself" demonstrations put out by farmers on their own farms. These could demonstrate the value of fertilizer to farmers not yet using it, and the need for adequate applications among farmers not yet using adequate amounts of plant food.

The meeting's program also included reports of the membership committee headed by R. E. Bennett of Farm Fertilizer, Inc., Omaha, Nebr., and the literature and film strip committee, of which D. A. Williams, Minnesota Farm Bureau Service Co., St. Paul, Minn., is chairman. Reporting for the projects committee, Chairman K. W. Wagenseller, Swift & Co., Hammond, Ind., summarized that important phase of the Committee's activities as follows:

"The Middle West Soil Improvement Committee has grants-in-aid at four state college experiment stations and has supported demonstration work and research work at two more. These grants-in-aid and the furnishing of fertilizer for demonstration work have been invaluable in getting new information and demonstrating the practicality of fertilizer use.

"At Michigan State College our grant-in-aid has covered the establishment of legumes with different nurse crops and different grades and ratios of fertilizer. This work is being summarized and the funds for the coming year will be applied to an extensive project designed to give additional correlation between soil test and fertilizer response; additional information concerning the fertilizer response curve at high rates of application; and to determine the effect of soil fertility on plant composition.

"At Minnesota our grant-in-aid has supported research on the effect of fertilizer on the establishment and longevity of alfalfa stands. This project has been in operation since 1949 and we have obtained substantial amounts of information and pictures on the response to fertilizer at the time of establishment (0 to 1,000 pounds per acre) and annual and biennial top dressings of various rates and ratios of fertilizer. Our grant-in-aid has terminated this year and we are discussing the possibility of a new project.

"Our grant-in-aid at Ohio has dealt with the effect on corn of fertilizer applied to sod crops the year previous and plowed down for the corn the following year. In greenhouse and field workers have been measuring the recovery of nutrients applied to sod crops and then the sod crops plowed down. All the data are not yet summarized. The project terminated this year, and we are discussing the possibility of new work for another year.

"At Iowa our grant-in-aid has supported work on the comparison of effectiveness of fertilizer applied in the fall vs. that applied in the spring. In addition, from this same project, which we support in part, comes information on the response to additional increments of fertilizer so that the workers can project the profitable response curves. Out of this project has come the information on which the recommendations for the fall use of fertilizer in Iowa have been based.

"In Kentucky our grant-in-aid covers work on the factors involved in soil structure that increase the efficiency of fertilizer in the production of tobacco, both in its effect on yield and on quality. This work is in its third year of our support.

"In Missouri we have contributed fertilizer through our member companies which has aided in the research and demonstration work in the state. This work has helped to provide new information. It has also helped to demonstrate to the farmers in the state that fertilizer is practi-

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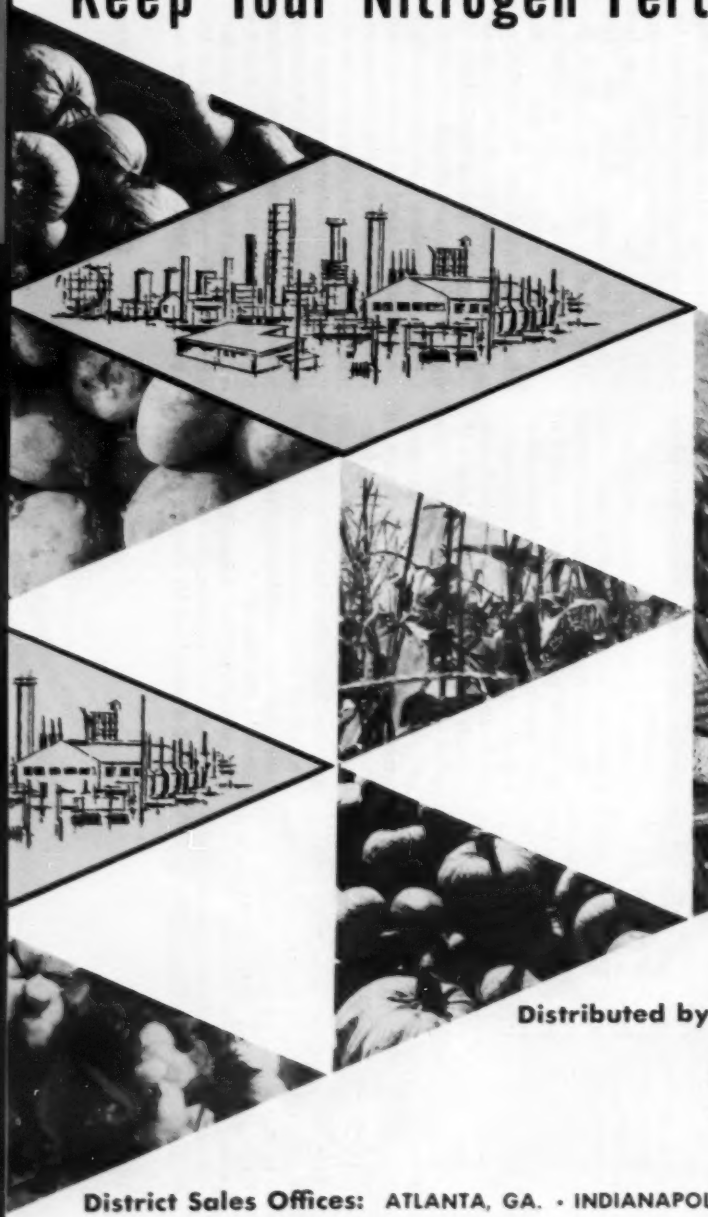

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cal and profitable. The men at Missouri have credited to this support a significant part of the success of their research and demonstration work.

"In Wisconsin the fertilizer which we had furnished for demonstrational work in cooperation with the American Potash Institute and individual fertilizer manufacturers has been the basis of a wide demonstrational program. More than 200 demonstrations each year for nearly 10 years have played a significant role in the development of fertilizer use in Wisconsin.

"Our investment in fertilizer research and demonstration work during the past 5 years has averaged between $10,000 and $14,000 a year. From this investment we have obtained a significant fund of new knowledge; have helped in the training of several promising scientists; and have contributed to the conviction on the part of many farmers that fertilizer use is practical and profitable on their farms."

In the afternoon session which terminated the meeting Charles Trunkey of the MWSIC staff showed color slides with a running commentary on how they are to be assembled into two complete presentations on hand seeding of legumes and on alfalfa production.

RECENT DEVELOPMENTS IN FERTILIZER MANUFACTURE

EDWIN C. KAPUSTA
Technical Service Director, United States Potash Company

Continued expansion of production facilities and revolutionary changes in the technology of fertilizer manufacture have characterized the fertilizer industry of recent years. The construction of plants for the manufacture of new and improved types of fertilizers and fertilizer raw materials, as well as the expanded production of the more conventional fertilizers has resulted in greatly increased quantities of plant foods for farm use. The changing pattern of fertilizer raw material availability in turn, has effected changes in the types of mixed fertilizers produced and the techniques and processes used in their preparation. Advances in the technology of fertilizer manufacture have been extremely rapid and far reaching, making a review of new developments in fertilizer manufacture most timely.

NITROGEN

The expansion of the nitrogen segment of the fertilizer industry in the past few years has been phenomenal; and its full impact has not as yet been felt. According to USDA reports, the 1950-51 supply of nitrogen for fertilizer use was estimated at approximately 1,250,000 tons of nitrogen. The latest available USDA report sets the 1954-55 total supply at 2.25 million tons of nitrogen; an increase of about 80 percent over the 1950-51 estimate. Still further increases in fertilizer nitrogen are expected in the immediate future as new plants currently under construction come into production.

The nitrogen expansion program, of course, has been based on the expanded production of synthetic ammonia, the leading source of fertilizer nitrogen materials. There have been many significant changes in the sources of raw materials used in synthesizing this all important compound. Coke, once the leading source of hydrogen synthesis, has given way to natural gas, which, in turn, is finding strong competition from petroleum refinery gases. Some new plants currently under construction will use low grade fuel oil as the starting point for hydrogen production whereas others reportedly will employ by-product coke oven gases as their raw material source of hydrogen. By-product hydrogen from electrolytic caustic production is also finding increased usage. Partial oxidation of natural gas by means of commercially pure oxygen ranks as another new innovation in the production of synthesis gas for synthetic ammonia production.

Not only has the total supply of fertilizer nitrogen sky-rocketed in the past few years, but the types of nitrogen compounds produced for fertilizer use have also witnessed many changes. Along with the expanded production of ammonium nitrate came significant increases in the manufacture and use of liquid and solid sources of nitrogen such as anhydrous ammonia, nitrogen solutions, urea, and ammonium phosphates.

In the past two years two newcomers, nitraphosphates and urea-formaldehyde polymers of controlled solubility, have entered the field of nitrogen fertilizers. Natural inorganic and organic, and byproduct nitrogen supply has remained relatively constant in comparison with the larger increases in supply of the nitrogen fertilizer materials mentioned above. Research continues on new types of nitrogen bearing chemicals for use as fertilizers, such as ammonium phosphate-nitrates and ammonium metaphosphates and many others, making further progress in the manufacture of new and improved fertilizers inevitable.

PHOSPHATE

In comparison to the tremendous expansion in nitrogen production in the recent past, the expansion in the phosphate branch of the fertilizer industry has been quite nominal. The supply of fertilizer phosphate has increased from about 1,921,000 tons available P_2O_5 in 1950-51 to approximately 2.312 million tons available P_2O_5 in 1954-55; an increase of about 20 percent over the 1950-51 total. It must be remembered that these are supply figures and do not correspond to capacity to produce, which is much larger than the supply figures given. In the case of nitrogen the capacity to produce and total domestic supply, excluding imports, correspond much more closely than similar figures for phosphate production capacity and supply.

Throughout the years, normal superphosphate has remained the leading source of fertilizer phosphate, although recent and current phosphate expansion has been and is in the direction of the more concentrated phosphatic fertilizer materials such as triple superphosphate and the ammonium phosphates. In the past five years triple superphosphate production has shown an increase by nearly 70 percent whereas normal superphosphate production has shown an increase of less than 10%. Reliable figures are not available for comparing the rise in ammonium phosphate production; but it has been significant and is continuing. The major portion of the increase has been in the manufacture of mono-ammonium phosphate or the mono-ammonium phosphate-sulfate combination based on the use of wet-process phosphoric acid. Recent reports indicate the production of di-ammonium phosphate containing fertilizers made by using this type of acid. The production of diammonium phosphate from electric furnace phosphoric acid, on a commercial fertilizer basis was started within the past year. Smaller quantities had

Presented at Annual Meeting, Association of American Fertilizer Control Officials, October 14, 1955, Washington, D. C.

been produced for some time for specialty uses. The increase in availability of wet-process phosphoric acid has resulted in the increased production of the so-called "enriched"-superphosphates, products made by treating rock phosphate with mixtures of phosphoric and sulphuric acid. These materials, usually containing 25 or 33% available P_2O_5 as compared to 20 and 45% available P_2O_5 in the conventional normal and triple superphosphates, are used almost exclusively in the manufacture of higher analyses mixed fertilizers. Newer developments in the manufacture of superphosphate fertilizers include an extension of the commercial application of continuous acidulation processes for the manufacture of both normal and triple superphosphate. Still other developments in triple superphosphate manufacture have been directed toward improvement of the ammoniation properties of these materials in relation to their use in the formulation of mixed fertilizers. As mentioned previously, the production of nitraphosphate fertilizers represents one of the more recent developments in the domestic fertilizer industry.

The more promising modifications of these processes involve the use of nitric acid in conjunction with the sulphuric or phosphoric acid ordinarily used in the manufacture of normal or triple superphosphate. The final product contains nitrogen and phosphate or, optionally, a source of potassium may be added to give a complete fertilizer. There are two such plants in commercial operation at the present time, one manufacturing a 12-12-12 and the other a 14-14-14 product. Reports indicate that a third plant of the nitra-phosphate type is under construction in the Far West.

A recent paper cites the pilot plant development of a process for the hydrolysis of calcium metaphosphate, reportedly making feasible its use in the manufacture of mixed fertilizers.

POTASH

Expansion is likewise the theme of the potash industry. In 1950-51 estimates compiled by USDA set our total potash supply for agriculture at about 1,300,000 tons of K_2O. Comparable figures for 1954-55 approximate a supply of 1.865 million tons of K_2O; an increase of over 40 percent in a period of five years. This expansion program is continuing. Two new companies have announced plans to initiate production at Carlsbad and increased production from established producers is also anticipated according to trade reports. The development of potash deposits in Canada continues to attract increased attention.

Dr. Kapusta, prior to his association with United States Potash Company, was chemical engineer of the National Fertilizer Association, and served as Co-Secretary of NFA's Plant Research Committee. He has been active on the fertilizer technology subcommittee of the National Joint Committee on Fertilizer Applications.

The trend toward higher analysis in mixed fertilizers and fertilizer raw materials has been reflected also in the potash industry expansion program. The emphasis has been on increased manufacture of the higher analysis potash carriers and decreased usage of lower analysis products. The increased production of granular potassium chloride, represents another comparatively recent development.

MIXED FERTILIZERS

The term "Chemicalization" has been used to describe the recent technological advances in the manufacture of mixed fertilizers. Chemical technology has replaced to a major extent time-honored, rule-of-thumb methods previously used in formulating mixtures. Although plants in all stages of technical development may be found, with the exception of some of the smaller plants, the present day mixing plant is a highly mechanized, chemical processing unit designed to produce fertilizers having improved physical and chemical properties.

The technological progress in the manufacture of mixed fertilizers has been largely associated with, and the result of, the commercial development of chemical raw materials containing higher percentages of the primary plant food elements. The increased production of these higher analysis raw materials has made possible the manufacture of fertilizer mixtures of increased plant food content. On a national basis, in the past five years, the average primary plant food content (nitrogen, available P_2O_5, and potash) of mixed fertilizers has increased from about 24% in 1950 to about 26.9% in 1953-54 according to the latest USDA fertilizer consumption report. The average plant food content is generally higher in the regions of the country where transportation costs play a more important role in determining the delivered cost to the consumer.

The increased use of these more concentrated fertilizer materials has also been responsible for many changes in processing methods used in the preparation of fertilizer mixtures. The most notable of these newer innovations are concerned with the ammoniation and granulation of mixed fertilizers.

The emphasis on economy of production through formulation based on greater use of more economical sources of the plant foods, expanded usage of anhydrous ammonia and nitrogen solutions in particular, has necessitated changes in processing to overcome possible deleterious effects on the physical condition of products made in this manner. Granulation has proven to be the principal method of overcoming such problems. Although dating back in origin many years, the greatest progress in the development and application of granulation processes has been made in the past few years. The popularity of granulation is evident by the large number of plant conversions and construction of new units currently taking place in the industry.

It is estimated that over 100 mixed fertilizer plants either have or are installing some form of granulation equipment. There are over 1200 plants engaged in the manufacture of mixed fertilizers. Manufacture of granular mixed fertilizers may approximate up to 15 percent of the total domestic production of mixtures in the coming fertilizer year. The continuing trend toward higher analysis and improved physical condition of mixed fertilizer, assures increased application of granulation methods. The greatest production of granular mixtures is centered in the Midwest where higher analysis mixed fertilizers are most widely used. However, notable progress in the manufacture of such products is being made in other areas.

Several types of granulation systems have been developed and used in commercial operation. Within the past two years continuous ammoniation and granulation processes have found rather widespread application. The basic feature of such systems is the introduction of the nitrogen source underneath the bed of solids in the ammoniator. Minerals acids such as sulphuric, and to a lesser extent phosphoric, may be added to

KEY TO MIDWEST PICTURES

Commercial Fertilizer Staff Photos

1—W. P. Glaspey and W. T. Thompson, Blue Valley Fertilizer Co., and Ed Kapusta, U. S. Potash Co.

2—Laurie Peterson, Midland Cooperative and G. W. Bunting, Central Farmers Fertilizer Co.

3—R. S. Bryant, Victor Chemical Co., Bert Tucker, Sohio Chemical Co., and Donald Dilworth, Klau-Van Pietersom-Dunlap.

4—Ray Sorenson, Cornland Plant Foods, Dean Gidney, U. S. Potash Co., and L. L. Jaquier, Phillips Chemical Co.

5—C. E. Trunkey of MWSIC Staff and Arthur Mullin, Indiana Farm Bureau Coop.

6—Bob Linderman, International Minerals & Chemical Corp., John L. Sanders, Mississippi River Chemical Co., and M. W. Lockwood, International Minerals & Chemical Corp.

7—MWSIC Staff conference: Zenas Beers and George Barclay.

8—Tracy Adcock, W. J. Klossner and Kirk Wagenseller, all with Swift & Co.

9—H. E. Wood, Farmers Fertilizer Co., T. F. Bradley, Potash Co. of America; and Arthur Mullin, Indiana Farm Bureau Coop.

10—Murray C. McJunkin, U. S. Steel Co., Al Bowers, Swift & Co., and W. E. Nordquist, U. S. Steel Co.

11—Werner L. Nelson, American Potash Institute and Proctor W. Gull, Spencer Chemical Co.

12—T. E. Camp, Jr., Southwest Potash Co., H. L. Holman and M. A. Barber, Missouri Farmers Assn.

13—Leo E. Orth, Minnesota Farm Bureau, E. T. Potterton, International Minerals & Chemical Corp., and Morris Newman, Price Chemical Co.

14—Doyle W. Simonsen, Simonsen Mill Rendering Plant, and Russell I. Pisle, Jr., Sohio Chemical Co.

15—Matt Sitter of Mackwin Co., and William J. Woodman of Velsicol Chemical Co.

16—R. E. Bennett, Farm Fertilizers and Russell Martin, Miami Fertilizer Co.

the mixture by means of a distributor similarly located. The heat of reaction which results from the combination of acid and ammonia promotes agglomeration and aids in reducing the moisture content of the mass. More intimate contact of reactants and better process control, permitting the incorporation of greater quantities of nitrogen from solutions, are cited as the major advantages of this method of ammoniation. In another granulation system which has found recent commercial application the entire mass of reactants passes through a slurry state prior to granulation and further processing. Regardless of process or method, the production of granular mixed fertilizers is certain to increase further.

The manufacture and use of fertilizer-pesticide mixture has increased in the past few years. It had been estimated that the use of such mixtures in the United States and Territories increased from about 90,000 tons in the 1952-53 year to approximately 150,000 tons in 1953-54 to about 200,000 tons in 1954-55. This represents roughly 1 percent of the total consumption of mixed fertilizers in that year. During the latter period about 188 companies in 41 states or territories registered or sold such mixtures. Although the use of these mixtures covers a large area, the South Atlantic and West North Central regions account for about 80 percent of the total consumption. The Pacific Coast area is the third largest consumer; representing about 7 percent of the total in 1953-54. Aldrin was used in the largest quantity in fertilizer insecticide mixtures, followed by chlordan and DDT in that order. BHC, dieldrin, heptachlor, lindane, and toxaphene and other compounds were used in lesser quantities. It has been estimated that more than half of the total tonnage of fertilizer pesticide mixtures used in 1953-54 was applied to corn. Potatoes, sugarcane, and vegetables reportedly used most of the remainder. Some reports indicate a continued growth in the manufacture and use of such mixtures. The expanding use of such products has presented the fertilizer manufacturer with many new problems and responsibilities regarding the manufacture and sale of such mixtures.

Another development which is currently attracting increased attention is the manufacture and use of liquid mixed fertilizers containing two or more of the primary plant food elements. The use of these materials has been centered in the far

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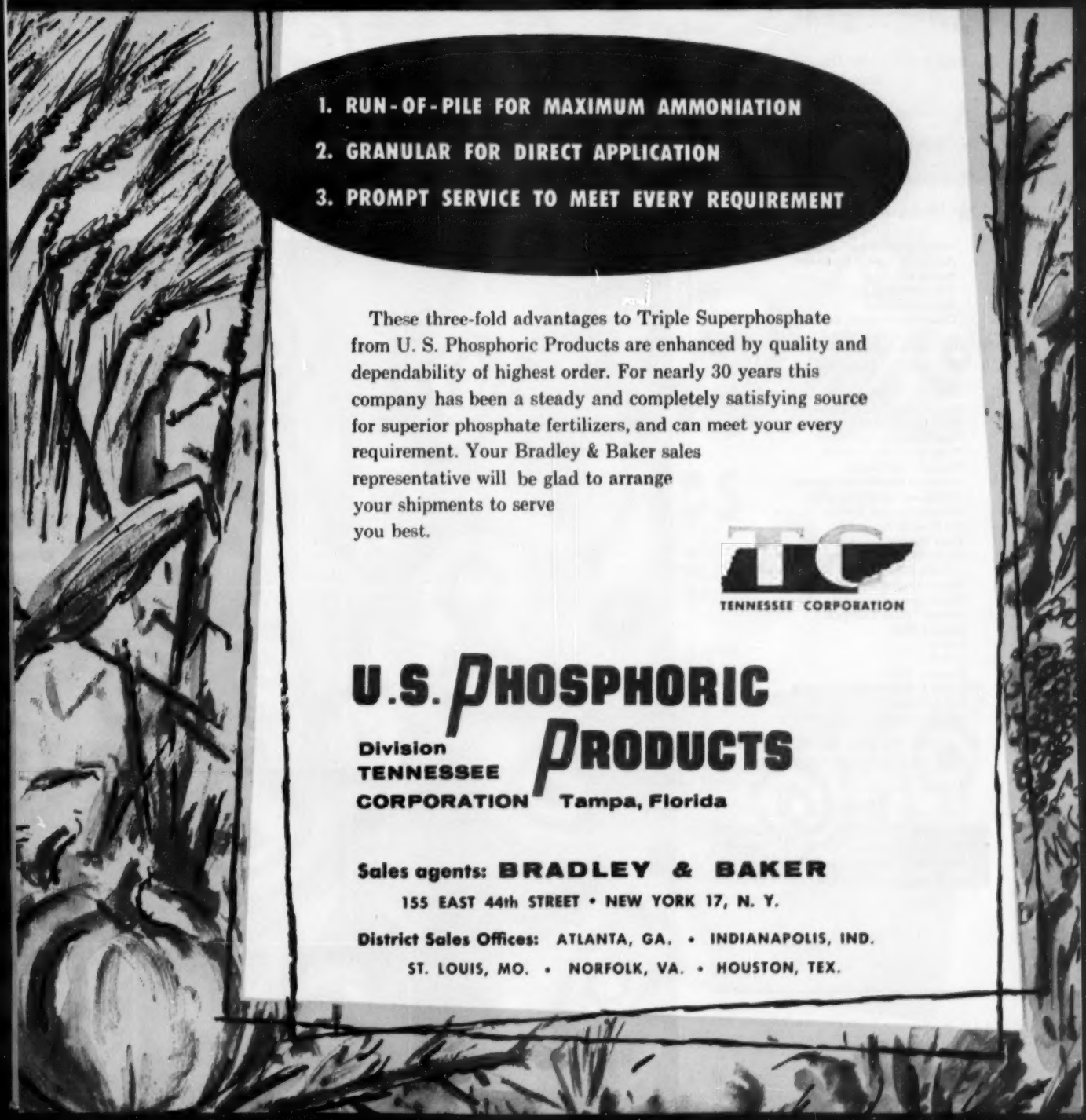

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west and southwest where agricultural practices favored their development and use. California, Washington, Arizona and Texas have been the leading areas of consumption, although the Midwest currently is recording a comparatively large growth in the manufacture and use of such products. The greatest increases are being experienced in the Indiana, Illinois, Iowa and Nebraska area. It has been estimated that in the 1953-54 fertilizer year, total domestic consumption approximated 27,500 tons; with about 20,000 tons being used in California. Although reliable figures are most difficult to develop, it is apparent that manufacture and use of liquid mixtures has increased greatly in the past year, especially in the midwestern area noted above.

There are two general methods of making liquid mixtures, based on the raw materials used in the formulation. The first, and most simple method, consists merely of dissolving in water the correct proportions of

KEY TO MIDWEST SOIL PICTURES

1—J. A. Hart, Spencer Chemical Co., and Marshal A. Smith, Smith Agric. Chemical Co.
2—Frank Calvin, Farmers Union Central Exchange, A. J. Reinberg, Fulton Bag & Cotton Mills, and A. H. Stephenson, Consumers Coop. Assn.
3—W. B. Copeland, Smith-Douglass Co., Inc., and C. E. Workman, Virginia-Carolina Chemical Co.
4—R. W. Fitzgerald, Smith-Douglass Co., Inc., and J. Van Rogers, Jr., Southwest Potash Corp.
5—Gaither Newnam, Smith-Douglass Co., and Jack Hicks, International Minerals & Chemical Corp.
6—Laurie Peterson, Midland Cooperatives, Inc., and Len Gopp, International Minerals & Chem. Corp.
7—C. E. Littlejohn, U. S. Potash Co., and Dr. G. N. Hoffer, Olin Mathieson Chem. Co.
8—Ove Jensen, E. I. Du Pont de Nemours & Co., and H. S. Vorhes, Vorhes Chemical Co.
9—Ray Paviak, Farmco Service of Wisconsin and John Zigler, International Minerals & Chem. Corp.
10—Frank Ronan, Grace Chemical Co.
11—B. B. Mainard, Farm Bureau Service Co. of Missouri.
12—Grant C. Davis, Pacific Coast Borax Co.

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the solid plant food carriers to give a desired grade. Materials, such as ammonium and potassium phosphates, ammonium nitrate, urea, potassium chloride, etc. are typical of the materials used. The investment involved in the installation and operation of such a process is comparatively small. The process equipment is standard and simple in design. The materials of construction of storage and handling equipment for the raw materials and finished products are not costly. The dissolution process may be carried out in tanks fabricated from mild steel or wood. A minimum of labor and power are required to operate the plant. However, the cost of raw materials is comparatively high, making for adverse process eco-

KEY TO MIDWEST SOIL PICTURES

1—Anne Mikul, MWSIC; W. W. Wilson, Ohio Farm Bureau, and Jim Thompson, Blue Grass Fertilizer Co.
2—Frank Kennedy, Potash Co. of America, S. C. Smith, Darling & Co.
3—Warren Huff, Duval Sulphur & Potash, Ashcraft-Wilkinson Co.
4—Grant Stevenson, Tri-State Fertilizer Co., R. E. Sorensen, Cornland Plant Foods, Glen A. Gunderson, U. S. Industrial Chemical Co., and Warren C. Johnson, U. S. Industrial Chemical Co.
5—R. S. Bullard, Inland Steel Co., Cash Cahill, National Potash Co., and Neil McClarnan, St. Regis Paper Co.
6—Richard Thatcher, V. W. Norris Co., W. P. Glaspey, Blue Valley Fertilizer Co., and A. C. Norris, V. W. Norris Co.
7—Cecil H. Fluty, Farm Belt Fertilizers, W. J. Klossner, Swift & Co., S. R. White, Spencer Chemical Co.
8—C. R. Martin, Miami Fertilizer Co., E. M. Kolb, American Potash & Chem. Co., and Dan Williams, Minnesota Farm Service Bureau Coop.
9—Jack Turner, Steve Turner Plant Foods, Howard Lathrope, Nitrogen Div., Allied Chemical, and Jerry Lyons, Turner Plant Foods.
10—J. F. Ryan, Fulton Bag & Cotton Mills, W. W. Wilson, Farm Bureau Coop., J. Frank Greeley, Fulton Bag & Cotton Mills.
11—W. F. Price, and A. F. Miller, Swift & Co.
12—H. J. Coleman, Standard Oil of Ohio, and W. W. Wilson, Ohio Farm Bureau.
13—Kenneth A. Keith, Spencer Chemical Co., Mrs. Grace Koos Anderson, N. S. Koos & Son, and E. H. Carbon, N. S. Koos & Son.
14—Paul Talley, Lion Oil Co., and Ed Kapusta, U. S. Potash Co.
15—Frank Nelson, Rath Packing Co., T. E. Bradley, Potash Co. of America, and Gerb Garrard, American Potash Institute.

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East St. Louis, Illinois
Greensboro, North Carolina
Houston, Texas
Jacksonville, Florida
Jeffersonville, Indiana
Memphis, Tennessee
Montgomery, Alabama
Nashville, Tennessee
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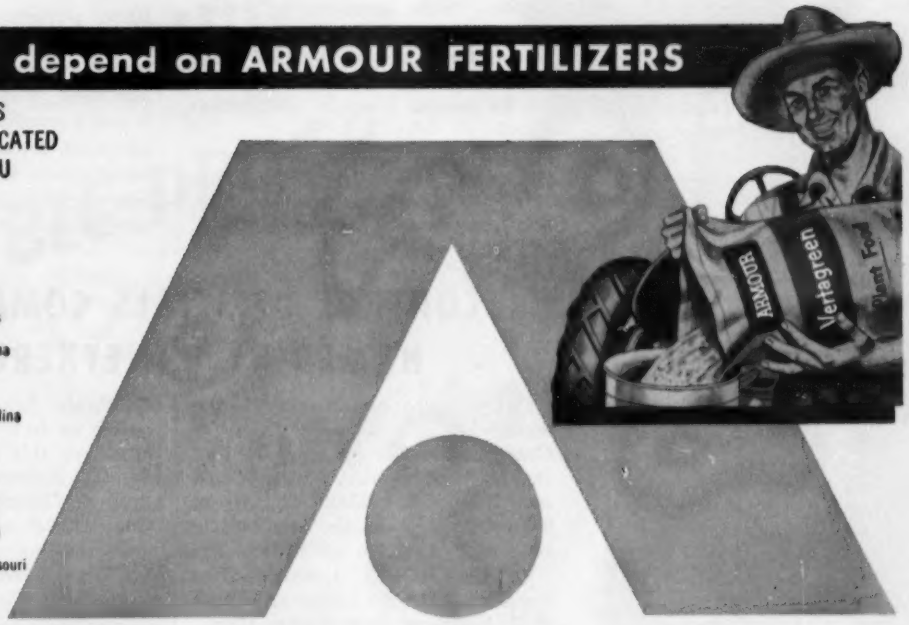

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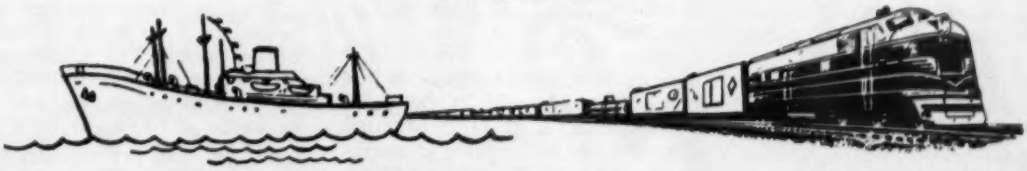

nomics. For this reason the use of such a process is generally limited to the manufacture of liquid mixtures for specialty uses.

The second, and most widely used process, is based on the neutralization of phosphoric acid with ammonia. In this system anhydrous or aqua ammonia, or ammonia-ammonium nitrate or ammonia-urea type nitrogen solutions are reacted with phosphoric acid followed by the addition of solid sources of nitrogen and/or potash, depending on the grade being made. Electric furnace phosphoric acid is normally used because neutralization of wet-process acid results in the formation of an objectionable precipitate. Urea and ammonium nitrate are the most common solid carriers of nitrogen, while potassium chloride is the most widely used source of potash. The process may be batch or continuous although the batch method is most widely used.

The widely varying physical and chemical properties of the raw materials and reactants, necessitates the use of more complex and costly processing equipment than that used in the simple solution process. Pressure type and corrosion resistant tanks are required for storing the liquid nitrogen and phosphoric acid solutions. Nitrogen solutions are normally stored in aluminum tanks, while rubber or plastic lined steel or stainless steel is commonly used in the construction of acid storage and handling equipment. The mixing tank is generally made of stainless steel or rubber-lined mild steel. If properly neutralized, ordinary steel tanks may be used in storing and handling the mixture.

Although a variety of grades of liquid fertilizers may be made, solubility characteristics and salt crystallization normally impose limitations on the manufacture of some of higher analysis grades. In general, the higher the plant food content, the higher the temperature at which crystallization begins to take place. Generally speaking, the upper limit for plant food content permitting relatively safe crystallization temperatures is between 25 and 30 percent total plant food; the specific concentration limit will be governed by the exact composition of the mixture. All liquid formulations should be pre-tested on a small scale, since there is no safe way of predicting solubility behavior of the components used in the formulation. Temperatures to be encountered in factory and field handling must be taken into account if salt crystallization is to be avoided.

Custom application of liquid mixtures is widely practiced. Other methods of distribution include: (1) delivery to the consumer in returnable tanks, (2) delivery to consumer-owned tanks at the point of usage and (3) delivery to consumer's tanks at the mixing plant or distribution depot.

Many factors, including process economics, availability of raw materials, agronomic considerations, and consumer use preference, etc. will play important roles in determining the ultimate place of liquid mixed fertilizers in the overall fertilizer picture.

The technological progress in the fertilizer industry in recent years has been truly remarkable. There is every reason to believe that these advances, some of which have been noted above, will continue at an accelerated rate assuring our agriculture of the very best in plant foods.

CONTROL OFFICIALS COMMITTEES NAMED BY DR. ETHEREDGE

Committee appointments for the Association of American Fertilizer Control Officials were announced by Dr. M. P. Etheredge, state chemist and dean of the School of Science, State College, Miss., the newly elected president of the association.

On the AAFCO states relations committee, Dr. Etheredge appointed H. J. Fisher of New Haven, Conn., as chairman. Others on this committee are R. C. Prewitt of Columbus, Mo., J. L. Clough of Dover, Del., J. A. Hennesy of Denver, Colorado, Henry Walls of College Park, Md., W. J. Huffman of Jackson, Miss., and Bruce Poundstone of Lexington, Ky.

Representing the fertilizer industry on the states relations committee are J. R. Archer of the International Minerals and Chemical Corporation, East Point, Ga.; E. C. Kapusta of the U. S. Potash Company, New York City, N. Y.; M. D. Sanders of Swift and Company's Plant Food Division, Chicago, Ill.; Vincent Sauchelli of the Davison Chemical Company, Division of W. R. Grace and Company, Baltimore, Md.; S. F. Thornton of the F. S. Royster Guano Company, Norfolk, Va.; W. J. Tucker, G. L. F. Soil Building Service, Inc., Terrace Hill, Ithaca, N. Y.

Dr. Etheredge appointed S. B. Randle of New Brunswick, N. J., to head the uniform fertilizer bill committee. The other members of this committee are Rodney C. Berry of Richmond, Va.; L. E. Bopst of College Park, Md.; B. D. Cloaninger of Clemson, S. C.; E. W. Constable of Raleigh, N. C.; E. A. Epps, Jr., of Baton Rouge, La.; W. B. Griem of Madison, Wis.; K. D. Jacob of Beltsville, Md.; A. B. Lemmon of Sacramento, Calif.; G. H. Marsh of Montgomery, Ala.; F. W. Quackenbush of Lafayette, Ind.; R. T. Wetherbee of Burlington, Vt.; Parks A. Yeats of Oklahoma City, Okla.

A. B. Lemmon of Sacramento, California, heads the special committee on fertilizer guarantees. The others on this committee are K. D. Jacob of Beltsville, Md., B. D. Cloaninger of Clemson, S. C., and F. W. Quackenbush of Lafayette, Ind.

On the uniform lime bill committee, Dr. Etheredge appointed Rodney C. Berry of Richmond, Va., as chairman. The others appointed to this committee are J. B. Smith of Kingston, Rhode Island; and W. B. Griem of Madison, Wisc.

To the other agricultural chemicals committee, Dr. Etheredge appointed F. J. Fudge of College Station, Texas, as chairman; and D. K. Myers of Harrisburg, Pa.; E. A. Epps, Jr., of Baton Rouge, La.; and L. T. Alexander of Beltsville, Md.

H. R. Allen of Lexington, Ky., was named to head the auditing committee. The others named to this committee are John A. Hennesy of Denver, Colorado, and Henry DeSalvo of Little Rock, Arkansas. M. B. Rowe of Richmond, Va., will be the new chairman of the credentials committee. Also appointed to this committee are Harry Johnson, Jr., of Atlanta, Ga., and E. R. Tobey of Orono, Maine.

E. D. Schall of Lafayette, Indiana, will chairman the resolutions committee. Floyd Roberts of Bismarck, N. D., and D. M. Stalter of Columbus, Ohio, are also on this committee.

The nominating committee will be headed by J. B. Smith of Kingston, Rhode Island. The other members of this committee are Rodney C. Berry of Richmond, Va., and Parks A. Yeats of Oklahoma City.

Appointed as investigators for the association are M. H. Snyder of Charleston, W. Va., general terms; J. W. Kuzmeski of Amherst, Mass., nitrogen products; J. F. Fudge of College Station, Texas, phosphorus; F. W. Quackenbush of Lafayette,

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Indiana, potassium; J. B. Smith of Kingston, R. I., calcium, magnesium, and manganese;

Rodney C. Berry of Richmond, Va., boron; M. B. Rowe of Richmond, Va., mixing and segregation; George Laramie of Concord, N. H., registration forms; G. H. Ridder of Olympia, Wash., publications; W. J. Huffman of Jackson, Miss., specimen labels; Crawford Winton of Oklahoma City, Okla., tonnage reports; J. C. Jones of Richmond, Va., pesticides in fertilizers; and E. A. Epps, Jr., of Baton Rouge, La., specialty fertilizers.

Control Officials Report Soon Ready

Official Publication (#9) published by the Association of American Fertilizer Control Officials will be available by December 1, at $2.00 per copy. Special discount will be given on lots of 100 or more copies.

The publication contains official definitions of the major fertilizer terms, proceedings of the 1955 annual meeting, model fertilizer bill, (tenth draft) summary of present states fertilizer laws, up-to-date list, addresses and telephone numbers of all fertilizer control officials in the United States, Canada and Puerto Rico. The publication also contains in detail all talks, including charts, graphs and tables, made by capable authorities on the following subjects: Plant Food Research as Related to Fertilizer Practices, Ratios and Multiple Grades as Related to Soil Testing New Developments in the Manufacture of Fertilizers, Current Trends in Complete Liquid Fertilizers, Acquainting the Public with the Fertilizer Control Officials Program. Distribution of Bulk Fertilizer in the U. S. in 1953-54.

Reports of all investigators, committees on changing fertilizer guarantees from the oxide to the elemental basis and the model state fertilizer bill, are included.

Orders should be filed now with B. D. Cloaninger, Secretary-Treasurer, Drawer 392, Clemson, S. C. A bill can be submitted or the check may accompany order.

Science Meet December 26-31

The 122nd Meeting of the American Association for the Advancement of Science will be held in Atlanta, Georgia, December 26 to 31, inclusive. Sixteen sections of the Association and approximately sixty-five affiliated and associated Societies will meet concurrently.

CFA Essay Subject Announced

The Soil Improvement Committee of the California Fertilizer Association has announced the subject of its 1955-56 fertilizer essay contest, "Use of Fertilizer on Pasture and Range Land". Forrest Fullmer, chairman of the sub-committee on vocational agriculture, said that the annual contest is open to all vo-ag students at California's Junior Colleges. This subject was chosen because of its broad application to all areas of the state, and because the field of pasture and range management has been largely neglected to the detriment of meat animal and dairy farmers.

OKLAHOMA P. F. E. S. CONFERENCE — NOV. 29-30 AT STILLWATER

TUESDAY Morning

PROGRAM

Dr. L. W. Reed, Chairman

10:30 A.M. Fertilizers—What Are They?
—Dr. J. Q. Lynd

11:10 A.M. The Need for Fertilizers In Oklahoma
—Dr. H. F. Murphy

11:35 A.M. The Role of Oklahoma A. & M. College in the Agriculture of the State
—Dr. L. E. Hawkins

TUESDAY Afternoon

Ferdie Deering, Chairman

1:30 P.M. The Years Ahead for Oklahoma Farmers
—Dr. Raymond D. Thomas

2:30 P.M. The Experiences and Trials of An Oklahoma Fertilizer Dealer
—P. J. Freiburger

3:15 P.M. How a Banker Looks at Fertilizers
—George H. C. Green

3:45 P.M. Fertilizer Dealer Panel—Problems, Solutions and Profits

Moderator—Ferdie Deering

Messrs. O. E. "Pete" Jones
Raymond Bigger
P. J. Freiburger
Jim Meigs
And Other Dealers in Attendance

5:00 P.M. Hospitality Hour

TUESDAY Evening

Parks Yeats — Master of Ceremonies

6:30 P.M. Buffet Dinner for Dealers

8:00 P.M. "You Should Take A Profit"
—Dr. R. C. S. Young

WEDNESDAY Morning

W. E. Bauman, Chairman

8:45 A.M. Practical Fertilizer Application Methods
—Dr. Vincent Sauchelli

9:20 A.M. Fertilizer Trends in Oklahoma; Past, Present and Future
—Dr. L. W. Reed

10:15 A.M. Panel—Practical Fertilizer Recommendations

Moderator—Dr. H. F. Murphy

Messrs. J. Q. Lynd, R. M. Reed, H. V. Eck, L. W. Reed, Fenton Gray, W. C. Elder, C. L. Sarthou, O. H. Brensing

11:00 A.M. Teamwork in Meeting Local Fertilizer Needs
—Wesley Chaffin

11:30 A.M. You—and the Oklahoma Plant Food Educational Society
—R. J. Kenyon

WHO'S WHO ON THE PROGRAM

W. E. Bauman — Soil Conservation Service, Oklahoma A. & M. College

Raymond Bigger — Farmers Grain and Seed Co., Enid

O. H. Brensing—Soils Dept., Okla. A. & M. College

Wesley Chaffin — Senior Extension Agronomist, Okla. A. & M. College

Ferdie Deering — Editor, Farmer-Stockman, Oklahoma City

H. V. Eck — Soils Dept., Okla. A. & M. College

W. C. Elder—Soils Dept., Okla. A. & M. College

P. J. Freiburger—Bar-Dew Grain and Feed Co., Bartlesville, Okla.

Fenton Gray — Soils Dept., Okla. A. & M. College

George H. C. Green—Vice-President, Liberty National Bank, Oklahoma City, Okla.

L. E. Hawkins—Director, Agricultural Experiment Station, Okla. A. & M. College

O. E. "Pete" Jones—Oklahoma Anhydrous Ammonia Co., Muskogee

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Colored Kraft	✓	
Bleached Kraft	✓	
Creped Kraft	✓	
Wax Laminated Kraft	✓	
Asphalt Laminated Kraft	✓	
Wet-Strength Kraft	✓	
Water Repellent Kraft	✓	
Stak-LOK Super Rough Kraft	✓	
Valve Bags—sewn or pasted	✓	
Open Mouth Bags—sewn or pasted	✓	
Flat Sewn Valve Bags	✓	
Flat Sewn Open Mouth Bags	✓	
KRAFT-lok Valve Closure	✓	
Creped Tape	✓	
Gummed Tape	✓	
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1-2-3-4 Color Printing	✓	
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J. Q. Lynd—Soils Dept., Oklahoma A. & M. College

Jim Meigs—Nichols Fertilizer and Chemical Co., Oklahoma City, Oklahoma

H. F. Murphy—Head, Agronomy Dept., Okla. A. & M. College

L. W. Reed, Soils Dept., Okla. A. & M. College

R. M. Reed—Soils Dept., Okla. A. & M. College

Chas. Sarthou—Soils Dept., Okla. A. & M. College

Vincent Sauchelli—Chief Agronomist, Davison Chemical Co., Baltimore, Md.

Raymond D. Thomas—Dean, School of Commerce, Oklahoma A. & M. College

Parks Yeats—Director, Feed, Seed and Fertilizer Control, Oklahoma City, Okla.

R. C. S. Young—University of Georgia, Atlanta, Georgia

Ammonia Institute to Hear Russian Tour Report

Herbert Pike of Whiting, Iowa, one of the 12-man agricultural delegation which visited the Soviet Union this summer, will give a first hand account of his Russian tour at the fifth annual convention of the Agricultural Ammonia Institute in Kansas City, Dec. 5-7. He will augument his remarks with color slides.

The 43-year-old farmer is expected to have an audience of 1,000 or more at the AAI's session at the Kansas City Municipal Auditorium at 11:15 a.m. Tuesday, Dec. 6.

Others who will give principal addresses at the convention are:

H. B. "Doc" Sharer of New York, U. S. Rubber Co., "What Makes a Star Salesman A Star."

Jack Minnoch of Chicago, executive director of the National Hide & Wool Association.

James H. Andrew of Andrew Farm Store, Jefferson, Iowa, "Distributor Problems."

Five of the nation's leading agronomists will take part in a panel that will conclude the convention. Their subject is "Agronomic and Soil Characteristics of NH_3". Dr. Louis B. Nelson, head of the Eastern Soil and Water Management Section, Agricultural Research Service, USDA, Beltsville, Md., will serve as panel leader.

Panel participants will be Dr. Daniel G. Aldrich, chairman, Division of Soils, College of Agriculture, University of California, Davis, Calif.

Dr. W. V. Bartholomew, Agronomy Department, Iowa State College, Ames, Iowa.

Dr. George E. Smith, Soils Department, College of Agriculture, University of Missouri, Columbia, Mo.

Dr. W. B. Andrews, Agronomy Department, Mississippi State College, State College, Miss.

Mark C. Craft, head of Midwest Fertilizer Co. of Springfield, Ill., is president of the AAI.

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New York Hanseatic Corporation at 120 Broadway, New York City, has been appointed exclusive distributor by Farbwerke Hoechst, Frankfurt-Hoechst, for their Fertilizer Compound, Calcium Ammonium Nitrate, now being packed under the ZEBRA Brand.

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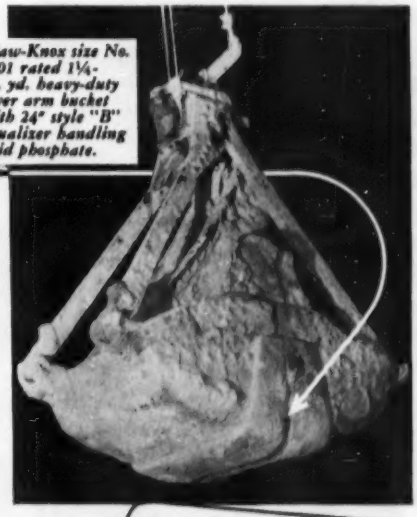

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CF Staff–Compiled TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by COMMERCIAL FERTILIZER Staff

	September		August		July	Apr.-May-June Quarter		January thru June		July thru December		Year (July-June)	
State	1955	1954	1955	1954	1955	1955	1954	1955	1954	1954	1953	1954-55	1953-54
Alabama	29,734	50,754	17,375	16,746	14,887	410,529	426,577	844,071	924,968	267,041	147,702	1,114,238	1,074,892
Arkansas	16,856	11,649	7,414	5,303	9,292	136,306	147,461	270,894	313,787	59,887	52,438	330,776	366,225
Georgia	13,340	11,784	16,226	13,103	51,173	718,919	761,348	1,047,875	1,147,157	225,083	218,027	1,273,445	1,361,254
Louisiana	12,007	11,823	3,954	6,390	6,888	108,810	110,348	1,047,875	250,747	78,067	74,471	310,848	325,218
Missouri	105,139	83,912	47,430	54,299	11,433	205,628	226,893	394,979	500,020	268,257	256,427	682,690	756,457
N. Carolina	34,182	41,805	15,575	20,377	12,417	740,666	694,799	1,566,158	1,558,472	264,475	257,100	1,830,633	1,815,572
Oklahoma	27,295	19,084	9,629	8,238	3,423	28,029	31,627	63,799	72,809	58,406	71,558	122,305	144,367
S. Carolina	18,134	20,722	23,221	11,033	11,355	269,475	160,908	791,206	752,639	132,604	183,919	928,715	936,558
Tennessee	21,441	19,435	11,817	9,921	25,862	218,999	322,123	282,462	405,756	167,383	107,544	523,349	523,303
Texas	42,850	36,121	12,588	12,817	20,311	156,592	168,687	371,587	374,309	212,885	186,097	584,269	560,381
Calif.	(reports submitted quarterly)					320,702	299,195	603,857	513,300	318,270	317,270	922,127	830,327
Virginia	(reports submitted semi-annually)					349,218	314,945	636,585	620,261	159,185	160,715	795,770	780,931
Indiana	(reports submitted semi-annually)							873,966	896,104	284,994	283,987	1,158,960	1,180,091
Kentucky	(reports submitted semi-annually)							433,102	489,024	91,386	88,905	524,488	577,929
New Jersey	(reports submitted semi-annually)							.....	231,686[1]	53,830	57,923	.....	289,614[1]
Washington	(reports submitted semi-annually)							124,186	101,779	58,162[1]	*	182,348[1]	*
TOTAL	320,978	307,089	165,229	158,227	167,041	3,663,873	3,665,897	8,537,508	8,921,132	2,641,753	2,464,088	11,102,613	11,233,505

..... (not yet reported) * Not compiled [1] Omitted from column total to allow comparison with same period of current year.

MARKETS

ORGANICS: There has been no change in the situation on Nitrogenous Tankage, prices varying from $4.10 to $5.10 per unit of Ammonia f.o.b. various production points, dependent upon the material.

CASTOR POMACE: No cars available just now. Nominal price $40.00 per ton, f.o.b. New Jersey.

DRIED BLOOD: Around $5.75 per unit of Ammonia f.o.b. Chicago.

GROUND COTTON BUR ASH: The movement has picked up on this material and it still can be obtained at 50¢ per unit of K_2O, f.o.b. production point.

PHOSPHATE ROCK: All of the producers have now settled with labor but the shortage of rock has stiffened the market with high grade rock still a little short.

AMMONIUM NITRATE: The usual slow seasonal movement now prevails.

GENERAL: While the movement has not picked up in other sections, fertilizers are moving in quite a lively way in Florida.

New Line of Fulton Valve Bag Packers

Introduction of a new line of valve bag packing machines embodying the most advanced developments, is being made by Fulton Bag and Cotton Mills. These packers will carry the brand name Ful-Pac, and are custom designed and built for Fulton by one of the nation's foremost manufacturers of bag packers. Addition of the packer line will provide further coordinated service to the many trades served by Fulton.

BERKSHIRE

Specialists in

Magnesia for Agriculture

EMJEO (80/82% Magnesium Sulphate)
Calcined Brucite (fertilizer grade) 70% MgO

POTNIT
(95% Nitrate of Potash)
for
Special Mixtures and Soluble Fertilizers
Other Fertilizer Materials

INSECTICIDES — FUNGICIDES
Mercury Compounds
for Agricultural Use

DITHIOCARBAMATES
Ferric — Zinc

EXPORT - IMPORT

BERKSHIRE CHEMICALS, INC.
420 Lexington Avenue, New York 17, N. Y.
55 New Montgomery St., San Francisco 5, California
Cable Address — "Berkskem" New York

LEAD LINED EQUIPMENT

or

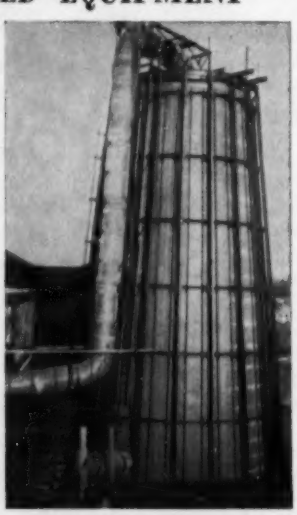
Construction

of

Complete

Acid

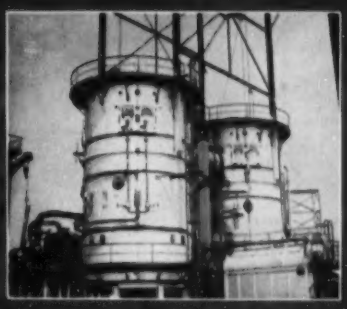
Plants



Southern Lead Burning Co.
ATLANTA 2, Ga.
P. O. Box 4627 Tel. WAlnut 2576

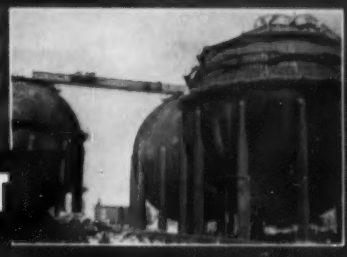
These progress pictures, made in August, show portions of Escambia Bay Chemical Corporation's nitrogen plant now nearing completion at Pensacola, Florida

ON SCHEDULE



Primary gas reformer units which are the heart of the process where natural gas is cracked to hydrogen.

Gas purification section where the main gas stream is freed of carbon dioxide and carbon monoxide in order to insure feeding a pure nitrogen-hydrogen gas stream to the converter.



Three storage spheres, with a total capacity of over 6,000 tons of anhydrous ammonia.

ESCAMBIA BAY

ESCAMBIA BAY CHEMICAL PLANT

Nitrogen materials for agriculture and industry will be available from the Escambia Plant which will provide complete nitrogen production for the Southeast. Products will include anhydrous ammonia, ammonium nitrate, nitrogen solutions and nitric acid.

Escambia Bay Chemical Corporation is owned by United Gas Corporation, Electric Bond and Share Company and National Research Corporation.

Please address communications to

ASHCRAFT-WILKINSON CO.

Exclusive Distributors

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DISTRICT OFFICES

Norfolk, Va. • Charleston, S. C. • Tampa, Fla. • Jackson, Miss. • Columbus, Ohio

PERSONALS

J. E. Totman, president of Summers Fertilizer, Baltimore, Md., announces the appointment of J. H. McNeill as production manager at Summers' plant in Sioux Falls, S. D., after six and one-half years at the Maryland Heights plant of the Missouri Farmers Association where he has been plant superintendent for the past four years.

Farm Fertilizers, Inc., Omaha, Neb., announces the election of Thomas J. Hoshall to the position of general manager, effective November 1st. Mr. Hoshall has been connected with the company since July, 1950 and has been vice-president for two years. The position of General Manager is in addition to that of vice-president.

Lee R. Hansen has been named sales supervisor of the Pacific Northwest area for the Western fertilizer division of **Olin Mathieson Chemical Corporation.**

Mr. Hansen will have his headquarters in Portland, Oregon, and will be responsible for sales in Oregon, Washington and Idaho.

Wilbur T. Kelsey has been named sales supervisor of Northern California.

Dr. Victor L. Sheldon, formerly assistant professor of soils at the **University of Missouri,** has joined the Western Fertilizer Division, agronomy staff, **Sam L. Nevins,** division vice president, has announced.

Dr. Sheldon will serve as agronomist for the company's North Central District which has headquarters at St. Louis. He will be concerned with research, development and promotion of Ammo-Phos water-soluble fertilizers, anhydrous ammonia, pesticides and other agricultural chemicals, and portable sprinkler irrigation systems.

* * *

In DuPont's chemical sales division **Frank G. Keenen,** formerly manager, nitrogen products sales section, is product manager for ammonia and related products effective November 1.

Francis M. Jornlin, who was assistant manager of nitrogen product sales, is now manager of that section, while **Myers F. Gribbins,** who was Philadelphia district manager of the same section, is his assistant.

Appointment of Malcolm E. Hunter, left, as assistant to the president of the Nitrogen Division, Allied Chemical & Dye Corporation, and of Walter S. Colvin as director of agricultural sales was announced Oct. 25.

Mr. Hunter will be responsible for sales, succeeding Fred Techter, who has agreed to continue on special assignments.

Frank McGrane has joined American Potash & Chemical Corporation's general sales department. He will operate out of the main office at Los Angeles on special assignments.

Chester R. Beam, not shown, has joined AP&C as a research engineer at Trona, Calif.

New district manager for the Southeastern territory for **Douglas Chemical Company** is **R. C. (Bob) Byrd.** Bob's territory includes North and South Carolina, Georgia, Florida and Alabama. The Douglas Chemical Company headquarters in North Kansas City, Missouri, and manufactures grain protectants, fumigants, insecticides and agricultural chemicals. Bob formerly was sales manager for the **Nelson Brokerage Company** of Atlanta, Georgia.

* * *

A. Siegel has been promoted to eastern division sales manager of bags and paper for the **Southern Kraft Division** of **International Paper Company,** is was announced by **George Stuhr, Sr.,** division sales manager. Since 1935, Mr. Siegel has served as assistant sales manager of the Southern Kraft Division in charge of all paper products.

Hugh B. Vergara has been named to replace Mr. Siegel as assistant sales manager. Mr. Vergara has been with the company since 1935 in different sales positions in the New York office.

* * *

C. E. Spear has joined **Consolidated Chemical Industries** as director of development for the Pacific and New England divisions. He will make his headquarters in the company office at 111 Sutter Street, San Francisco.

* * *

Bradley & Baker, New York, announce the appointment of **L. Paul Campbell, Jr.** as sales representative at their Norfolk, Va. office.

* * *

Appointment of **Edgar C. Lloyd Jr.** as Sales Representative for Northern Mississippi and southern Arkansas has been announced by **Fulton Bag & Cotton Mills,** New Orleans.

Four leading forms of Nitrogen

Commercial Solvents Corporation produces and supplies fertilizer manufacturers with four important forms of nitrogen. The three liquid forms are widely used for the preparation of high-analysis fertilizers and for the ammoniation of superphosphates. Exclusive, granular CSC Ammonium Nitrate fertilizer is distributed solely by fertilizer manufacturers. This high-quality, uniform product is manufactured at Sterlington, Louisiana. Adequate storage facilities assure prompt shipments and service. For complete information including Technical Data Sheets, write Agricultural Chemicals Department, Commercial Solvents Corporation, 260 Madison Avenue, New York 16, New York.

COMMERCIAL SOLVENTS CORPORATION
260 MADISON AVENUE, NEW YORK 16, N. Y.

CSC
AGRICULTURAL CHEMICALS

NITROGEN THE HEART OF THE HARVEST

DOLOMITIC LIMESTONE

ANALYSIS GUARANTEED

. . . 60% Calcium Carbonate
. . . 39% Magnesium Carbonate

WILLINGHAM-LITTLE STONE COMPANY

1323 Fulton National Bank Building, Atlanta 3, Ga.

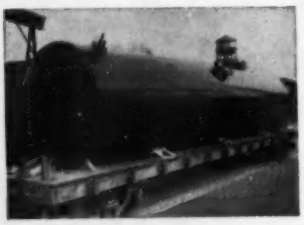
"41 Years Service to the Fertilizer Industry in the Southeast"

ALUMINUM TANK
9'-0" Diameter x 30'-0" Long
12,825 Gallons

"Cole" can furnish tanks made of **steel, aluminum** and **stainless steel** — built in accordance with ASME Code to meet all insurance requirements. Measuring tanks of Stainless Steel are carried in stock.

We invite your inquiries for Storage Tanks to handle Ammonia and Nitrogen Solutions. Anhydrous Ammonia—complete with fittings. Also Elevated Water Tanks, Acid or Oil Storage Tanks, Bins, Boilers, Stacks, etc.

R. D. COLE MFG. COMPANY
Newnan, Ga.



STEEL TANK
8'-6" Diameter x 38'-6" Long
16,500 Gallons

For your lead requirements!

CHEMICAL AND ANTIMONIAL

sheet lead and lead pipe

Evans Metal Company

Box 97 Northside Station • ATLANTA, GEORGIA • Elgin 4338

For Bagging **— CHI-ORGANIC —** *For Mixing*

(Chicago Activated Sludge)

"THE ALL-ORGANIC PLANT FOOD WITH THE BUILT-IN CONDITIONER"

CHICAGO FERTILIZER COMPANY

Exclusive Sales Representatives

ALEX. M. McIVER & SON

P. O. Box 155 Charleston, S. C. Tel. 3-4828-29

C. L. "Chuck" Monson, Spencer Chemical Company's agricultural sales representative for Iowa during the past five years, has been promoted to the post of product sales supervisor. Mr. Monson will work directly under Claude Byrd, Spencer's agricultural chemicals sales manager.

Election of **J. S. Ebright** as its president was announced by **Agricultural Laboratories, Inc.,** producer of innoculants for legume crops Columbus, O.

Mr. Ebright succeeds **M. M. Elmers,** who has severed his connection with the firm.

William K. Westwater of Westwater Supply Co. was named vice president and **George Thomas,** Columbus accountant, was elected secretary-treasurer.

* * *

The appointment of **Wallace J. Majure** as district manager of the California Spray-Chemical Corporation was recently announced by **H. J. Grady,** vice-president and regional manager-East, marketing department for Calspray. From his office at Maumee, Ohio, Mr. Majure will supervise operations in the Great Lakes area.

M. E. Wierenga, previously district manager, has been appointed manager, foreign sales department, at Calspray's home office in Richmond, California.

William E. Jaqua's appointment to the position of Western regional supervisor, fertilizer sales, was recently announced by **C. E. Cody,** Western regional manager. Jaqua will supervise fertilizer sales in the eleven Western states.

* * *

Carl A. Arend has been appointed general manager of the Potash division of **International Minerals & Chemical Corporation,** it was announced by **Nelson C. White,** vice president in charge of the division, who until recently was general manager of the Potash division.

Mr. Arend has been manager of International's mining and chemical operations at Carlsbad, N. M. He will report to Mr. White and will assist him in the management of the Potash division. Before his transfer to New Mexico in 1949, Mr. Arend operated the corporation's potassium chlorate plant. He has been with them since 1945.

Samuel O. Wilkes has joined Arkell & Smiths, as a sales representative in the Florida area, it has been announced by Frank Smith, Southern division sales manager at Mobile, Alabama.

J. H. Robertson, shown here, has been named treasurer and comptroller of Arkell & Smiths. Mr. Robertson has been Arkell & Smiths Comptroller since 1950.
John Craft McAndrew, Jr., has joined them as a Sales Representative in the Southern Division, and will work out of Jackson, Mississippi.

Fourth Edition on Minor Elements

The Chilean Nitrate Educational Bureau, Inc., 120 Broadway, New York 5, N. Y., announces publication of Volume IV of the Fourth Edition of the Bibliography of References to the Literature on the Minor Elements and Their Relation to Plant and Animal Nutrition.

Previous editions of this Bibliography were published as follows: First, 1935; Second, 1936; Third, 1939. The 1st. Supplement to the Third Edition appeared in 1940; the 2nd, 1941; the 3rd, 1942; the 4th, 1943; the 5th, 1944; the 6th, 1945; and the 7th, 1947.

The appointment of Stafford Beaubouef, left and Bob Gibbs to the sales staff is announced by the Grand River Chemical Division of Deere & Company.
Mr. Beaubouef will be sales representative for the company in Louisiana and surrounding territory. Mr. Gibbs assumes the position of sales representative in the Iowa-Illinois area.

Volume I of the Fourth Edition, comprising all of the material in the Third Edition and seven Supplements and complete to June 30, 1947, was published in 1948. It included 10,000 abstracts, covering 206 crops, 45 elements, and 4,483 authors. Complete indices were provided, i.e., Author, Element, General Nutrition and Botanical.

Volume II contained 1,222 abstracts published in scientific journals from July, 1947 to December 1950. It included 141 crops, 45 elements, and about 1,300 authors and co-authors.

Volume III contained 1,000 abstracts published from January 1951 to December 1952, representing 1,249 authors and co-authors and covering 45 elements. Complete indices are provided.

Volume IV, 14th publication in this series, contains 1,363 abstracts representing 1,747 authors and co-authors and covers 38 elements. Complete indices are provided.

INDUSTRY CALENDAR

Date	Organization	Place	City
	1955		
Dec. 5-7	Ag. Ammonia Institute	Municipal Auditorium	Kansas City, Mo.
	1956		
Jan. 4-6	Weed Society of America	New York Hotel	New York, N. Y.
Jan. 16-18	Sou Weed Conf.	Jung Hotel	New Orleans, La.
Feb. 6-8	Sou. Ag. Workers	Biltmore	Atlanta, Ga.
Feb. 15-17	Western Weed Control Conf.	Univ. of Calif.	Davis, Calif.
Mar. 4-6	Sou Safety	Biltmore Hotel	Atlanta, Ga.
Mar. 14-18	Nat'l Ag. Chem.	Hollybeach Hotel	Hollywood Beach, Fla.
June 28-30	Sou Control	Hotel Roanoke	Roanoke, Va.
June 28-30	Pacific N.W.		Yakima, Wash.
July 18-20	SW Grade	Buccaneer Hotel	Galveston, Tex.
July—	Eastern Canada		Mont Tremblant, Que.
Oct. 19	Control Officials	Shoreham	Washington, D. C.

CROP CHEMICALS

CANADIAN MEET ATTRACTS 200

There will be better knowledge available in the future for protection of plants against diseases and plant pathologists will contribute to better plant disease control, S. J. Chagnon, assistant deputy minister of Agriculture, Ottawa, told close to 200 delegates attending the third annual meeting of the Canadian Agricultural Chemicals Assoc. recently at Ste-Adeleen-haut, Que.

Much more effective fertilizers, insecticides that will be absorbed by the plant through its leaves and roots, and much cheaper soil conditioners, will be some of the important discoveries of the agricultural chemicals industry in the next decade.

Chemical discoveries will accelerate plant breeding and new industrial uses will be found for agricultural products, Mr. Chagnon stated. Plant protein will form a larger part of the human diet following extraction and processing. Number and importance of synthetic and tailormade foods will increase—tremendously if man succeeds in unraveling the secrets of nature such as photosynthesis.

Ramsay G. Smith, president and general manager of Charles Albert Smith Ltd., Toronto, was elected president of the Canadian Agricultural Chemicals Assoc. for the next term. Other officers elected included Dr. E. P. Aikman of Nichols Chemical Co., Montreal and K. B. Owens of Monsanto Canada Ltd., Montreal, as first and second vice-president respectively. Merle E. Ward of Du Pont Co. of Canada, Toronto, was elected secretary and J. H. Elliott of Rohm & Haas Co. of Canada, Toronto, was elected treasurer.

WEED SOCIETY CHARTER MEET

The economic problems caused by weeds and the progress in weed control in the United States, Canada and Great Britain will be highlighted at the charter meeting of the Weed Society of America at the Hotel New Yorker, New York City, January 4 and 5.

Hosts to the meeting will be the Northeastern Weed Control Conference whose annual meeting will be held on January 6.

The Weed Society, founded December 8, 1954 was formed to encourage and promote the development of knowledge concerning weeds and their control through publishing research findings, fostering high standards of education, encouraging effective regulation and promoting unity in all phases of weed work.

R. H. Beatty, American Chemical Paint Company, Ambler, Pa., is serving as president during the organization period. Other officers are W. B. Ennis, Jr., USDA, State College, Miss., vice-president, and W. C. Shaw, USDA, Beltsville, Secretary-Treasurer.

The first day of the two-day Charter Meeting of the Society will be devoted to a discussion of problems, progress and organization of weed control in England, Canada and the United States, with talks concerning weed control as a part of American agriculture, industry's views of modern weed control and weed control educational problems in the United States. A paper on the mechanisms of herbicidal action will also be presented.

Sectional meetings are planned for the second day to discuss various phases of weed control in agronomic and horticultural crops, control of weeds in turf and non-agricultural areas and weed control teaching and extension. Other subjects for sectional meetings will be the control of aquatic weeds and the public health, regulatory and ecological, physiological and edaphic aspects of weed control.

Chairmen of the sectional meetings will be:

Control of Weeds in Agronomic Crops—C. J. Willard, Ohio State University and Agricultural Experiment Station, Columbus, Ohio.

Control of Weeds in Horticultural Crops—R. D. Sweet, Cornell University, Ithaca, New York.

Control of Weeds in Non-Cultivated Areas—R. A. Darrow, Texas A. & M. College, College Station, Texas.

Ecological, Physiological and Edaphic Aspects of Weed Control—A. S. Crafts, University of California, Davis, California.

Weed Control in Turf—G. C. Nutter—University of Florida, Gainesville, Florida.

Public Health—A. H. Fletcher, State Department of Health, Trenton, New Jersey.

Regulatory—W. S. Ball, California State Department of Agriculture, Sacramento, California.

Teaching and Extension—E. P. Sylwester, Iowa State College, Ames, Iowa.

Control of Aquatic Weeds—F. L. Timmons, United States Department of Agriculture, Laramie, Wyoming.

Present plans call for the society to meet every two years with one of the four regional weed conferences serving as host to the meeting.

Calspray Open House At New Research Center

Leo R. Gardner, manager of the research and development department for the California Spray-Chemical Corporation, welcomed guests to the open house held September 23, in the new laboratories of the bio-screening section of Calspray's research and development department at Richmond, California.

The new lab is a part of the company's program for expanded research facilities and will be used to develop new, safer, and more effective Ortho pesticides for use by growers and gardeners throughout the world.

The expansion in Calspray's Research and Development Department marks the beginning of the multi-million dollar expansion program that includes a 16-million dollar fertilizer plant and additional quarters for administrative and office personnel. The entire program is scheduled for completion late in 1956.

Shell Builds New D-D Storage

In order to meet the increased demand in the Southeast for its soil fumigant, D-D®, Shell Chemical Corporation has installed a 1,260,000-gallon storage tank at Wilmington, North Carolina, F. W. Hatch, manager of the agricultural chemicals division, has announced.

Diamond Black Leaf to Operate Geigy Plant

Plans for Diamond Black Leaf Company, Cleveland, Ohio, to take over operation of the Des Moines, Iowa pesticide processing plant of the Geigy Agricultural Chemicals Division of Geigy Chemical Corporation, New York, on December 1 were announced November 3 jointly by Loren P. Scoville, president of Diamond Black Leaf, and Dr. George R. Ferguson, president of Geigy's Agricultural Chemicals Division.

Built in the fall of 1954 at a cost of $500,000 and put into operation early this year, the Des Moines plant produces insecticides and weed killers for distribution throughout the plains states of Ohio, Michigan, Indiana, Illinois, Kentucky, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Wyoming, Montana, and Colorado.

Diamond Black Leaf Company was formed in February of this year. The new firm, which absorbed the operations of the Black Leaf Products Division of Virginia-Carolina Chemical Corporation, Richmond, Virginia, manufactures and markets the Black Leaf line of insecticides, herbicides and fungicides.

Operation of the Des Moines agricultural chemical plant "gives Diamond Black Leaf its fifth formulating facility, the others being located at Richmond, Virginia; Louisville, Kentucky; Montgomery, Alabama, and Waco, Texas.

Dow Chemical SE Offices

The Dow Chemical New Orleans office has been raised to full sales office rank, and Robert J. Minbiole has been appointed manager. Their Atlanta office, founded in 1950, has moved to the new Fulton National Bank Building. Leroy C. Stewart, 37-year Dow veteran, is manager.

RESEARCH RESULTS REPORTS & RUMORS

Stealing from himself is what a farmer does who fails to replenish the soil from which come his crops, is the way CFA puts it in one of their excellent press releases.

* * *

No cure is known for Florida citrus' spreading blight of burrowing nematodes, despite new stories to the contrary, says Dr. E. P. Ducharme, one of the team which discovered the pest, which causes the disease which now afflicts more than 6,000 acres of bearing grovelands.

* * *

Speedometer which measures farmlands, as a check on precise acreage applications is being offered by the O. W. Kromer Company, 1120 Emerson Avenue North, Minneapolis, 11.

* * *

Bitter carrots are a problem being researched by Cornell scientists at the Geneva (NY) experiment station. Food processors would like to know what happens during storage to change the flavor.

* * *

Poisoned roses were the problem tossed at the Connecticut AES. They traced the problem to paint containing mercury to resist fungus attack, which gives off a mercury vapor which injures the Better Times rose and similar varieties.

* * *

Salty soil, the result of burned up farmlands when lack of rain forced use of salt water, was cured by a farmer in Texas who used sulphuric acid. Southwest Fertilizer and Chemical Co., El Paso, supplied it. Western Cotton Oil Co. suggested it after study of tests made in Arizona. Better ask Bill Nelson of SF&C.

* * *

Ask locally for soil analysis, suggests USDA. Chemical testing is not enough, and local authorities can best interpret soil conditions in the light of local peculiarities.

* * *

5-way fertilization. Mid-West Soil Improvement Committee lists five ways to use fertilizer in the Fall: Broadcast and plow under in fall; add to winter wheat; feed old permanent pastures; top-dress legume meadows; to build up run down pastures.

* * *

Placement saves money. Enough fertilizer, well placed can save many a seed which otherwise would be wasted, according to USDA's Beltsville research center, which says $50,000,000 is lost annually through wasted seed alone.

* * *

Foliar feeding is best for crops says Dr. H. B. Tukey, Michigan State, who has demonstrated that even the dormant stems of woody plants, in the dead of winter, will absorb a water solution of fertilizers sprayed on them. He says 95% of soluble fertilizers applied to leaves of crops are used by the plants.

* * *

Seaweed contains a lot of plant food. A ton assays 10 pounds of N, 10 of P, 15-20 pounds of K, 50 pounds of salt and 400 pounds of organic matter. By comparison, manure has 11 of N, 6 of P, 15 of K and 300 of organic matter. Obviously the salt should be eliminated from the seaweed . . . unless you want to look into the sulphuric acid item mentioned above.

* * *

Efficiency on the farm has made big changes. CFA, going back only 15 years shows that crop production has increased 44%, with 19% less man-hours, and says one farmer can produce for himself and family, plus 24 non-farm people. On the other hand, American Meat Institute, going back 50 years shows a contrast of the farm worker producing for 7 people then, 20 people now. Both credit better farm practices, but especially mechanization. The Institute quotes 160% tractor increase, 230% milking machine increase, 320% more combines . . . and, the thing that interests us most, a 320%

Another completely new and larger two-wheel-drive "PAYLOADER" tractor-shovel, model "HAH", has just been announced by The Frank G. Hough Co., Libertyville, Illinois.

The new model, which has a struck capacity of ¾ cubic yards and a heaped capacity of 1 cubic yard, incorporates all of the features of the smaller "HA" model which was introduced in February of 1955 after three years of development and field testing.

Complete information and literature on this new "PAYLOADER," scheduled for production in January 1956, may be obtained from The Frank G. Hough Co., 702 Seventh Street, Libertyville, Illinois.

increase in the use of commercial fertilizers.

* * *

Corn and what fertilizer does for it is the subject of reports of which we get a lot. For instance: Marshall County, Kansas, had a tough year, but by steping up fertilizer the corn crop worked out all right. Arkansas has a farmer who averaged 100 bushels per acre on 265 acres this year with 82N-100P-90K per acre. He picked early to beat the bugs. Missouri boasts a farmer who, despite only a half inch of moisture since July 1 (and he has cracks in the ground to prove it) harvested 50 bushels per acre, with anhydrous ammonia and 12-12-12 fertilizer. Mississippi claims a new world record of 304.38 bushels per acre by a 16-year old 4-H club member, who used 1000 pounds of 14-14-14 per acre, 200 pounds of ammonium nitate under the crop and 300 as side dressing. Plowed twice. No irrigation. Variety: Funk's G-711. Texas has a man who produced 100 bushels to the acre and noticed that the further from the barn he planted, the fewer weevils.

* * *

Lifeblood of Florida agriculture is fertilizer, says Dr. Gaylord M. Volk, Florida AES soils chemist—"Just as water is the lifeblood of California agriculture.

* * *

Flavor, improved by plant food, converted cattle who had turned up their noses at lespedeza sericea in Alabama. The farmer used 500 pounds per acre of 0-12-20, and now the cows eat like horses and are all fat, the man says.

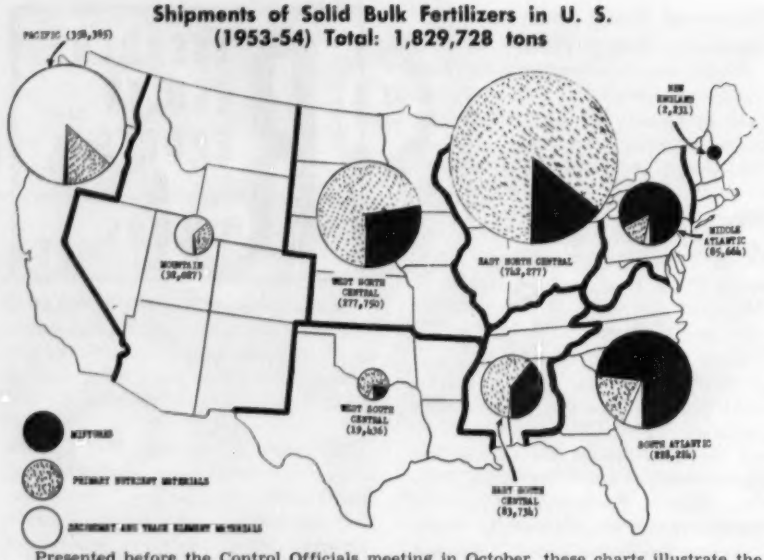
* * *

Mistake triples yield, headlines the Farm Journal over a story about a Texas wheat grower who set the anhydrous ammonia valve at 50 pounds per acre, decided it could stand some more and opened her up a bit. After a while he found out he had poured on 126 pounds per acre. Instead of burning it up, as he expected, his wheat turned out to average 64 bushels per acre . . . so his $12.60 per acre anhydrous brought him in an extra $92.25 worth of wheat. That's a mistake he'll probably make again.

* * *

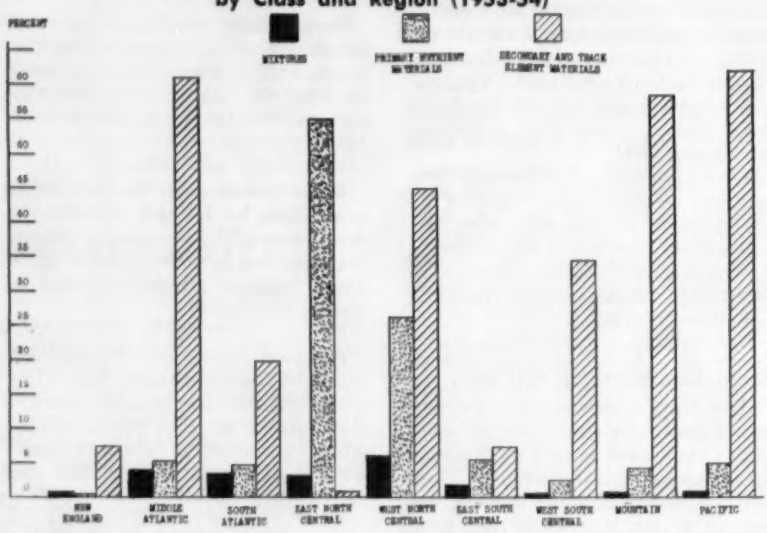
Moisture is vital, they found out in the Columbia Basin. They had cherished the notion that you could use plenty of nitrogen and just plant over the stubble of last year's crops. No fallow. Just seed, fertilizer and grow a crop every year. It worked all right until a dry year proved that you must have moisture, no matter how much N you put on the ground.

Shipments of Solid Bulk Fertilizers in U. S. (1953-54) Total: 1,829,728 tons



Presented before the Control Officials meeting in October, these charts illustrate the report on distribution of bulk fertilizer in 1953-54 prepared by Walter Scholl, Hilda M. Wallace and Esther I. Fox, USDA, Beltsville, reported in our October issue.

Percent of All Solid Fertilizers Shipped in Bulk, by Class and Region (1953-54)



But the annual crop idea does work, and next year about twice as much will be annual-cropped, according to R. O. Fletcher, secretary of the Pacific Northwest Crop Improvement Association. Getting down to the economics of it: To make every-year cropping pay, two annual crops must equal one wheat-after-fallow crop, with enough extra to pay for the nitrogen, planting and harvesting costs of the second crop.

* * *

Maine goes to anhydrous ammonia on a test basis—which may sound odd to planters well south of there. It is interesting to remember how few years it has taken, however, since anhydrous was first grudgingly tested along the Gulf coast—and how it has swept northward, until Maine is one of the few areas where it has to be explained to farmers.

* * *

Cold water depresses rice yields, according to Robert M. Hagan, Davis head of the department of irrigation, U of Cal. Cold irrigation water delays heading, prevents filling of grain, delays maturity. Injury below 70° and 77° as the minimum temperature level for good production seems to be the story, with 90°—the highest tested — giving the best growth and highest development. The way to bring up the temperature is to slow down the flow of water, run through shallow canals, cut back weeds that shade canals.

* * *

N for nuts! John A. Cox, Louisiana AES horticulturist, says the way to boost pecan yields is to use plenty of N, either in Spring or Fall.

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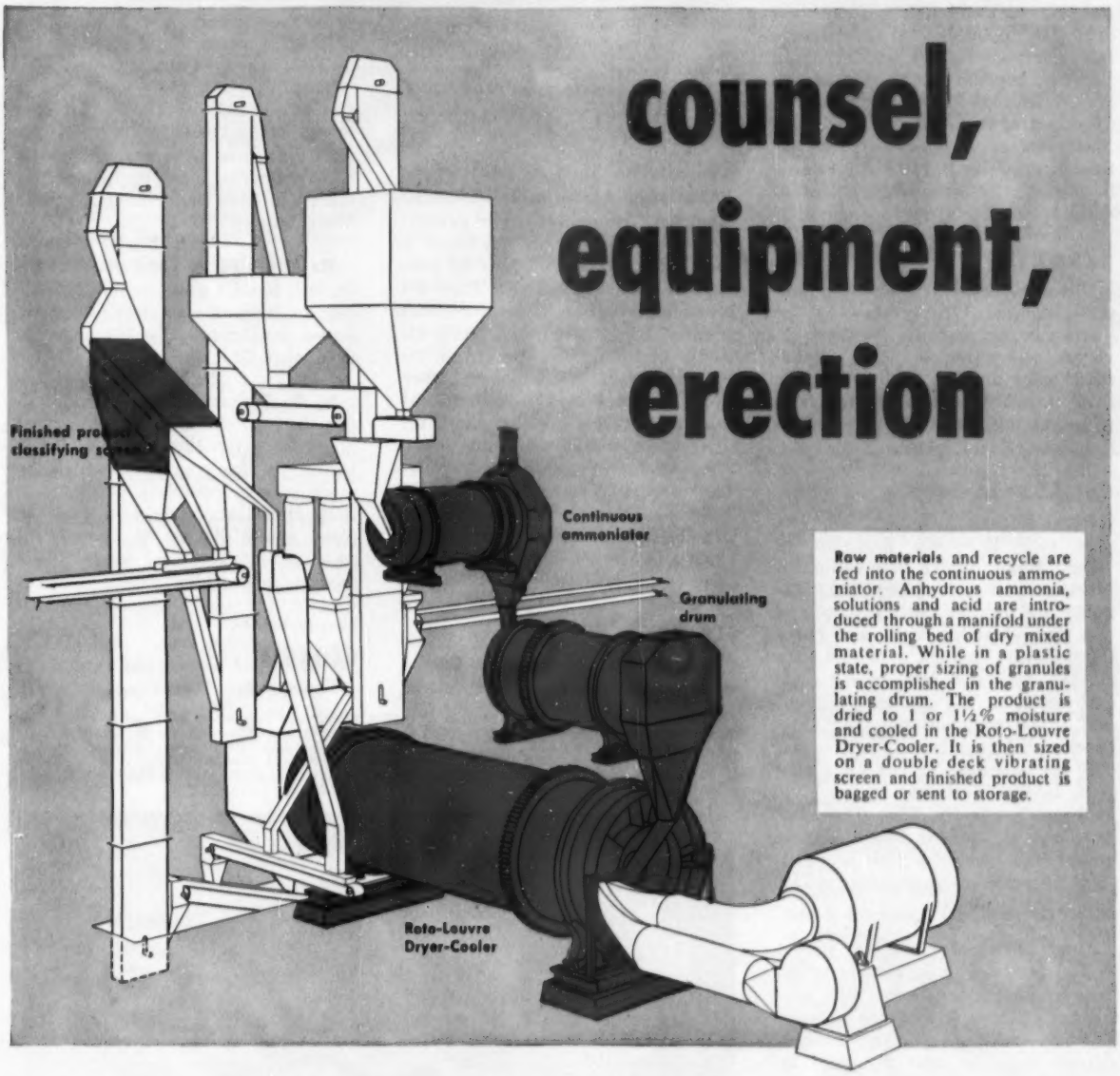
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ARIZONA

Thunderbird Chemicals has taken up the option it held on 122 acres near Kyrene, and will build there a $13,000,000 plant as soon as engineers have completed plans, which should be soon because production is expected in 1956. **Fred Shanaman** is president of the concern which was incorporated a year ago by Mr. Shanaman, **John B. Mills** and **Ronnie B. Smith.** Northwestern Mutual made the financial arrangements.

ARKANSAS

Olin-Mathieson is supplying two new high analysis grades to the Southwest through its Western division. According to **G. A. Wakefield,** sales director of the division, these are 16-8-8 and 15-30-0, both pelletized, and produced at their Pasadena, Texas, plant.

CALIFORNIA

Parks-Barnes, Los Angeles, last year sold 15,000,000 packages of "Black Magic" which they call a soil substitute for indoor planting. The Parks and Barnes are the names of two girls—Martha Parks and Betty Barnes—who met on a double date in 1949, borrowed $500, mixed their first batch in the garage . . . and sold 15,000 packages the first year. Now, with international distribution, they are planning to put up a new plant in the West, one in the Midwest, another in the East. The present plant in Hermosa Beach will be turned into a country club for their plant personnel — complete with swimming pool.

* * *

Brea Chemical's prilling tower, whose progress was last reported here in September, went into production October 1, and has shipped its first carload of prilled ammonium nitrate, the first ever produced in the West.

* * *

Hercules Powder is beating its swords into plowshares as the once world's largest producer of dynamite, the little town of Hercules, will stop all explosives production and produce only fertilizer chemicals in the 75-year-old community. Here many welfare activities were first introduced to industry—a resident physician, a plant hospital, a hospital care plan, an employee club run entirely by the workers, and founded in 1896.

* * *

Agricultural Ammonia Service of Santa Paula has set up another in its chain of San Joaquin Valley operations, where they have been marketing anhydrous ammonia for three seasons. The most recent plant is located at Mendota, with **Dick Enarson** in charge, according to **Rick McClun,** assistant salesmanager. Plants previously established at Patterson, Visalia, Hanford, Bakersfield, Santa Paula and Lancaster. Plans are in the words for installations at Shafter and Lodi.

COLORADO

Umbaugh Agricultural Chemicals, Memphis, Tenn. have begun preliminary construction on the first of three plants to be built near La Veta, to total some $10,000,000. They will produce phosphoric acid, ammonium sulfate and anhydrous ammonia, using high-volatile coal from the Walsenburg area. President **Raymond Umbaugh** says the parent company will operate the new plants until their Colorado subsidiary can complete its organization. Umbaugh was originally formed in San Antonia, Texas, has offices in Memphis and Plymouth, Ind., plants in Indiana and Florida. It distributes fertilizers in 25 states east of the Rockies.

FLORIDA

International Minerals & Chemical's radio communications system, which contributes heavily to their Bartow operations efficiency was held up as an example of the need for more industrial radio frequencies when their general engineering head, **J. G. Ivy** spoke recently at the American Mining Congress.

They have 35 mobile units, on two frequencies. One band ties together maintenance, mining, milling and staff departments. On the other four spot networks keep small working teams in the field in touch with home base.

* * *

Na-Churs Plant Food Co., Marion, O., will build a plant at Winter Garden to offer a complete, balanced liquid fertilizer to Florida growers. (See, also, Ohio)

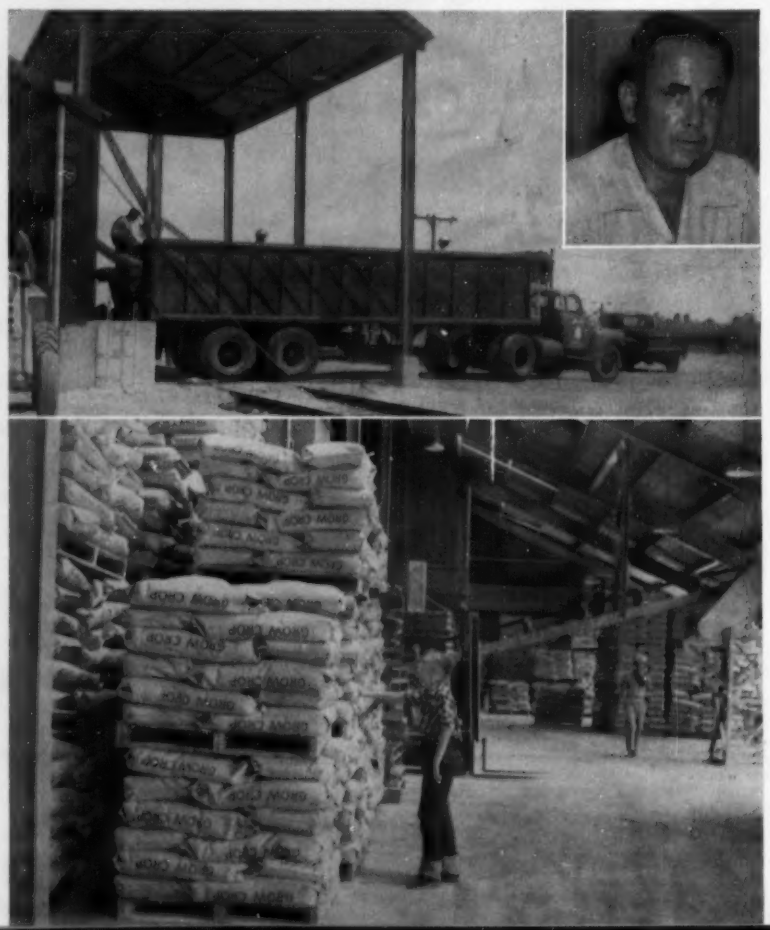
* * *

M. R. Dickerson, whose main office is in Philadelphia, announced plans for a fertilizer plant at Stock Island in the course of which he made a very complete public relations presentation, stressing that the plant would dispose of its own refuse, be odorless—and would bring payrolls and added profits to local people. The plant will process fish into fertilizer.

GEORGIA

The Girdler Company, Louisville,

When the new Illinois Farm Supply granular plant was dedicated at Tuscola middle of last month, here are just a few of the things visitors saw: Covered combination loading docks for all weather handling of trucks or rail shipment. Palletized storage of bagged goods for quick fork-lift handling. Conveyors that relieve the human work-load. Insert H. E. Causey, manager of the plant, a million dollar operation, one of the most modern in the industry, and the first of its type in the U.S.



Ky., are contractors and engineers on the $14,000,000 Southern Nitrogen plant, Savannah, discussed at some length here last month. **Dr. Robert Read** is in charge for Girdler.

IDAHO

Central Farmers Fertilizer will spend $7,500,000 to open a phosphate mine and build a processing plant on their property near Georgetown, according to **Joseph J. Lanter,** president. The plans are for an operation that will extract 100,000 tons of 0-60-0 fertilizer material from 500,000 tons of ore to be in production by 1958. CFC is owned by 16 regional co-ops serving the area between the Alleghanies and the Rockies, and from Oklahoma to the Canadian border.

ILLINOIS

Illinois Anhydrous Ammonia Co., with 29 plants in the corn belt has been purchased by **Mid-South Chemical. W. M. Banks,** owner, will continue as manager of the Illinois division for Mid-South.

* * *

Charles T. Gildersleeve & Son, Hudson, hybrid seed corn producers, are building a liquid fertilizer mixing plant with a capacity of 200 annual tons, and will operate five tank applicators.

* * *

Allen Lumber Co. owned by **Ralph** and **Harry Allen,** Allerton, have what they locally call a soil drugstore. **Stedman Foundry and Machine** have built them a push-button plant which fills a fertilizer "prescription" at the rate of a ton of fertilizer, mixed and down the chute to a waiting truck, in 60 seconds. Bagging equipment is being added.

INDIANA

Davison Chemical will enter the liquid fertilizer field with a plant to be built in Wakarusa, with a capacity of 15 hourly tons, serving parts of Indiana and Michigan.

The plant and its associated marketing activities are projected as a developmental operation on a comparatively large scale and will provide means for advancing knowledge of materials and of testing improved processing methods.

Its main purpose will be to serve as the focal point of a program to expand the market potentialities of liquid fertilizer — this to include study of needed analyses, better application methods and cooperation with dealers for more effective sales operation. The Wakarusa location was chosen because the area comprises all four main types of farming—grain, vegetable, fruit and berry, and livestock, and is a large consumer of fertilizer.

When the plant goes into operation, about March, 1956, it will turn out fertilizer in analyses of 9-9-9, 5-10-10 and 10-5-5. In addition to these liquid products, a warehouse stock, supplied from other Davison plants, will be maintained of Davco granulated fertilizer in bulk and in bags, and in all recommended analyses. Hence, Wakarusa will be a center of distribution to cover any fertilizer needs or application methods—irrigation, plowed under, side dressing or top dressing.

Davison believes that there will be significant expansion of the liquid fertilizer market. The proposed new plant is expected to furnish information on the directions which this expansion will take. A course of research to be pursued vigorously will be for means of formulating high analysis fertlizers which will not "salt out". This will give the liquid fertilizers an important economic impetus, because of reduction in cost of handling and transporting water.

The Wakarusa plant will bring to 20 the number of Davison plants concerned with production of fertilizer materials or mixed fertilizers. It will be in the district managed by **Bernard C. Manker,** whose headquarters are at Lansing, Mich., and Mr. Manker has appointed one of his staff, **Frank Goris,** to be manager at Wakarusa. Mr. Manker and the other two fertilizer district managers report to **W. N. Watmough, Jr.,** Davison vice-president at Baltimore company headquarters.

LOUISIANA

Humble Oil announces a major sulphur deposit discovery, off Grand Isle. Vice-president **Carl E. Reistle** says it can rank among the top three or four sulphur discoveries in the world.

Lion Oil Division is pushing for January completion of the facilities which will serve their new ammonia plant at Luling. A 400-foot wharf with high-capacity pumps and pipelines will permit direct loading of ocean tankers and river barges. Lion is now, as our readers know, a division of **Monsanto.**

MARYLAND

Swift's plant food division is enlarging its loading dock and building a warehouse building containing 20,400 square feet at the Curtis Creek plant. Completion of construction will give this plant about 100,000 square feet of floor space. **R. M. Murray** is superintendent.

MINNESOTA

Rochester Fertilizer, Rochester, is rapidly completing its $150,000 building which will be equipped to mix 20 hourly tons, bag 20-30 hourly tons, and store 3000 tons. **Roy L. Miller** is managing the operation for the locally owned and financed corporation.

MISSISSIPPI

Mississippi Chemical's plant at Yazoo is turning out 100 tons a day more than last year's daily average of 350. September set a new record with 491 daily tons, according to **Owen Cooper,** executive vice-president. He also stated that the original investors in the $17,000,000 plant have already gotten their money back. $8,000,000 of the money came from Mississippi farmers.

* * *

Laurel Oil and Fertilizer, Laurel, had a disastrous fire late last month, which destroyed their fertilizer plant and seed storage house. President **Dennis T. Granberry,** said damage may reach $250,000 in buildings, cottonseed and freshly mixed fertilizer, only half of which was covered by insurance. Mr. Granberry is newly elected president of the **Mississippi Manufacturers Association.**

* * *

All-State Fertilizer, Greenwood, lost a warehouse, 40 tons of fertilizer and 80 tons of cotton poison in a mid-October fire. **Noll Davis** owns the concern, which is managed by his son, Noll, Jr.

MISSOURI

Deep Root Company, Iolanthe, broke ground for a $185,000 pelletized fertilizer plant, most of which was locally financed. A. W. Bintner is president; Paul E. Snow, vice-president. Among the distinguished visitors at the ceremony was **Dr. William A. Albrecht,** U of Missouri, who was guest speaker. The plant

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is due to be in production by December.

NEW YORK

GLF's new plant at Big Flats was opened with formal ceremonies, October 28, attended by directors, outlet managers and committeemen from 100 miles around. The new $750,000 plant is geared to turn out some 30,000 annual tons of fertilizer, including granular, and replaces the building in use for 12 years by GLF, which was a converted tobacco processing plant when originally built in 1912. The new plant is of special steel construction, includes seven three-story bucket elevators, and has a 9,000 ton storage capacity.

* * *

Synthetic Nitrogen Products Corp., 285 Madison Avenue, New York 17, has been chartered by **Henry Mann, William H. Mann** and **James G. Scarff.**

OHIO

Na-Churs Plant Food Co., Marion, in addition to the plant they are building in Winter Park (See Florida, above), are adding to the Marion facilities. The total outlay will run to $100,000, according to **H. A. Petrich,** president. They produce liquid fertilizers, marketing in a 27-state area.

* * *

DuPont will replace the present sulphuric plant in Lockland with a new one to be called the Fort Hill Works, and located about 20 miles from Cincinnati on the Ohio River. **Grasselli Chemicals** will operate it.

OKLAHOMA

Ozark-Mahoning Chemical, West Tulsa plans a $2,000,000 expansion which is planned for operation by Fall next year. Officials said the expansion would more than double gross sales. **C. O. Anderson** is president.

TENNESSEE

Chapman Engineering is manufacturing irrigation equipment at Arlington, the second such concern to locate in Shelby County this year. **E. R. Ledbetter** is general manager and **Glee Melcher** salesmanager of the concern, which is a division of **Chapman Chemical,** Memphis.

* * *

Knoxville Fertilizer has been issued a permit for a $40,000 fertilizer plant in Johnson City.

TEXAS

Southwest Fertilizer & Chemical are building in El Paso what amounts to a giant-size Quonset, 200 feet long by 65 feet wide by 30 feet high, of heavy corrugated iron and without truss supports of any kind, which will withstand 100 mile gales. The floor is concrete slab. The structure—which is of a type often used for grain storage in the Plains States—will serve to equalize production by supplying more storage space. **W. G. Nelson,** SF&C general manager says it will permit better aging because it will increase storage by 5,000 tons of bulk and 500 tons of bagged goods.

* * *

Texas Farm Products are constructing a new, modern fertilizer plant at Nacogdoches. All steel, 300 feet by 130 feet, the plant is expected to be turning out Lone Star fertilizer by the first of the year. It is located next to the Lone Star phosphate plant, and will produce high analysis, goods, as well as pelletized.

The present plant will be converted into a modern warehouse with facilities for more efficient truck loading. Docks will have overhead roofs for all-weather loading of four trucks at once.

UTAH

Garfield Chemical, jointly owned by American Smelting and Kennecott Copper, is now building a new sulphuric unit, at its Garfield plant. The new unit, to cost $2,500,000 and to turn out 250 daily tons, will supply not only fertilizer mixers, but uranium millers as well.

VIRGINIA

Virginia-Carolina Chemical, whose 60th anniversary is being celebrated, as we noted here last month, have published a delightfully written book about those sixty years, in a suprisingly frank way, as for example: "For V-C the early thirties brought internal differences that shook the faith of customers, of stockholders—and even of employees. But the corporation weathered the conflict. And by 1939 V-C had won back much of the confidence it deserved." The final paragraph sums up the story the book tells: "Despite the growth of V-C in terms of plants and products, V-C's founders would recognize many things about the present-day organization—the friendly feeling among employees, the spirit of service to V-C customers. And, most important, they would find that Vir-

Shown as they boarded a private plane at Baltimore for a trip to Houston and a tour of the Olin Mathieson Ammo-Phos plant at Pasadena, Texas, are agronomists from the Northeast. Left to right in the front row are Prof. J. H. Eakin and Dr. D. P. Satchell of Pennsylvania; Prof. C. E. Phillips, Delaware; Dr. H. L. Dunton, Virginia; Dr. C. B. Smith, Pennsylvania; Dr. E. R. Purvis and Dr. R. B. Alderfer, New Jersey; Dr. J. D. Campbell and A. B. Verdery of Olin Mathieson; Dr. W. C. Kelly and Dr. N. C. Brady, New York. On the plane's ramp, bottom to top, are Dr. S. R. Aldrich, New York; Dr. G. G. Pohlman, West Virginia, and Dr. F. L. Bentz, Jr., Maryland.

Agronomists from the Great Lakes district who visited the plant are pictured here as they toured the University of Houston demonstration farm adjacent to the plant are (left to right standing) Dr. Touby Kurtz and L. B. Miller, University of Illinois; Dr. A. J. Ohlrogge and Roy Bronson, Purdue University; Dr. W. A. Seay and H. F. Miller, University of Kentucky; Dr. R. L. Cook and Dr. R. L. Carolus, Michigan State University; Dr. H. J. Mederski and Gordon Ryder, Ohio State University; John Murdock and C. J. Chapman, University of Wisconsin; W. F. Watkins and Virgil F. Green, Olin Mathieson. Kneeling to sample the soil are Sam Cottrell and John Beatty of Olin Mathieson.

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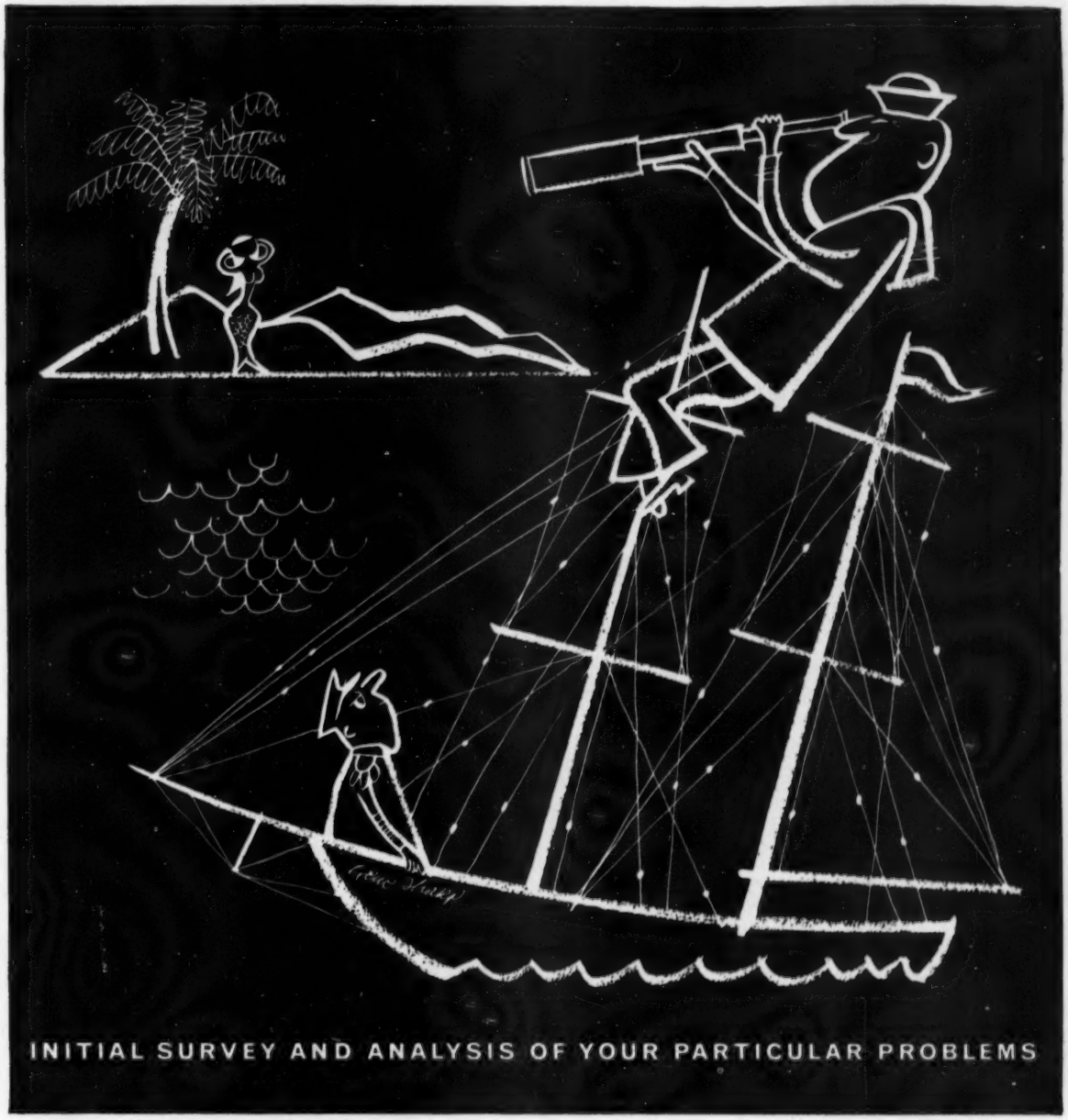

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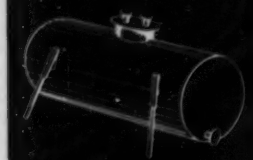

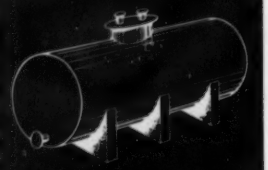

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ginia - Carolina Chemical Corporation continues to work in partnership with the soil."

WASHINGTON

Phillips Pacific Chemical and **Pacific Northwest Pipeline** have chosen Pasco as the site for their $20,000,000 joint venture into anhydrous ammonia. The plant will convert some 15,000,000 daily cubic feet of natural gas into 200 daily tons. A pipeline 1,496 miles long will bring the gas from the Southwest to the Northwest.

WISCONSIN

Farmco Service's general manager **Ray L. Pavlak** has announced the introduction of granular fertilizers to their line, and that equipment is now being installed in their Prairie du Chien, Whitewater and Green Bay plants. They will continue to offer pulverized fertilizer.

BOLIVIA

Fabrica de Acido Sulfurico, Bolivia's only producer of sulphuric, is expanding facilities from 2 daily tons to 5 daily tons.

CANADA

Canadian Industries Ltd. and **Chipman Chemicals** will join forces in their pesticide manufacture, creating a joint concern to be known as **Chipman Ltd.** with offices in Montreal, controlling plants in Buckingham, Hamilton, Winnepeg and Moose Jaw. Their other operations will remain separate.

• • •

Inland Chemical's new $1,000,000 sulphuric acid plant at Fort Saskatchewan is now in operation.

• • •

Shawinigan Chemicals have construction under way on their new $750,000 sulphuric plant at Shawinigan Falls. It will have a capacity of 25,000 annual tons and be in production in the Fall of next year, according to **Victor G. Bartram,** president. Excess will be sold to neighboring industry.

• • •

Interprovincial Cooperatives, Manitoba, will spend $30,000 for an addition, 60 x 100 feet, to their present plant. It will double existing warehouse space.

CHILE

Compagnie Nord Africain de l 'Hyperphosphate Reno will build a superphosphate plant at Penco with a 45,000 annual ton capacity. North African phosphate rock will be imported.

ENGLAND

Monsanto's British subsidiary will spend $1,400,000 for a plant at Newport, Monmouthshire, which will be in operation by the end of 1957, and will produce phthalic anhydride, which is used, among other things, as an insect repellent.

FRANCE

Compagnie Francaise California Spray Chemical are building a $1,500,000 fungicide unit near Marseilles which should be in production by next Fall.

INDIA

Fertilizers & Chemicals, Travancore Ltd., Udyogamandal P. O., Alwaye, Travancore - Cochin State, South India is planning a capital expenditure of about $6.3 million for plant expansion. The company invites tenders on the following equipment:

Water electrolytic cells for the production of hydrogen for ammonia synthesis for 3 million cubic feet of hydrogen per day; 110-kilovolt substation and rectifiers for the production of d. c. power, 20,000-kilowatt capacity; air liquefaction nitrogen plant for 2 million cubic feet of nitrogen per day; ammonia synthesis

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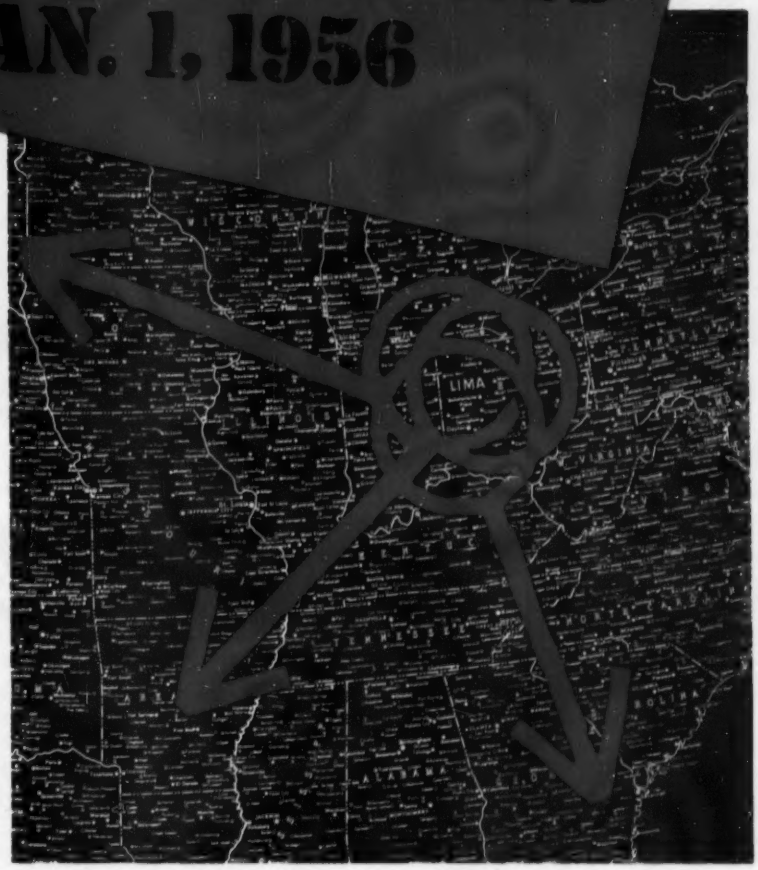

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Ready to serve your needs faster and more economically—is our fleet of new tank cars, tank trucks, and van drays.

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Production of our complete line of nitrogen chemicals gets underway this fall at our new Lima, Ohio plant. But . . . in order to serve you better during your peak season, we will accumulate most of our production in our huge storage facilities until the first of the year. Then . . . on January 1, 1956 we will begin shipments against contracts.

SOHIO

For Complete Product listing

and price quotations . . . write to

SOHIO CHEMICAL COMPANY

P. O. Box 628 • Lima, Ohio

We are telling 3½ million farmers

Fertilizer Grows Farm Profits

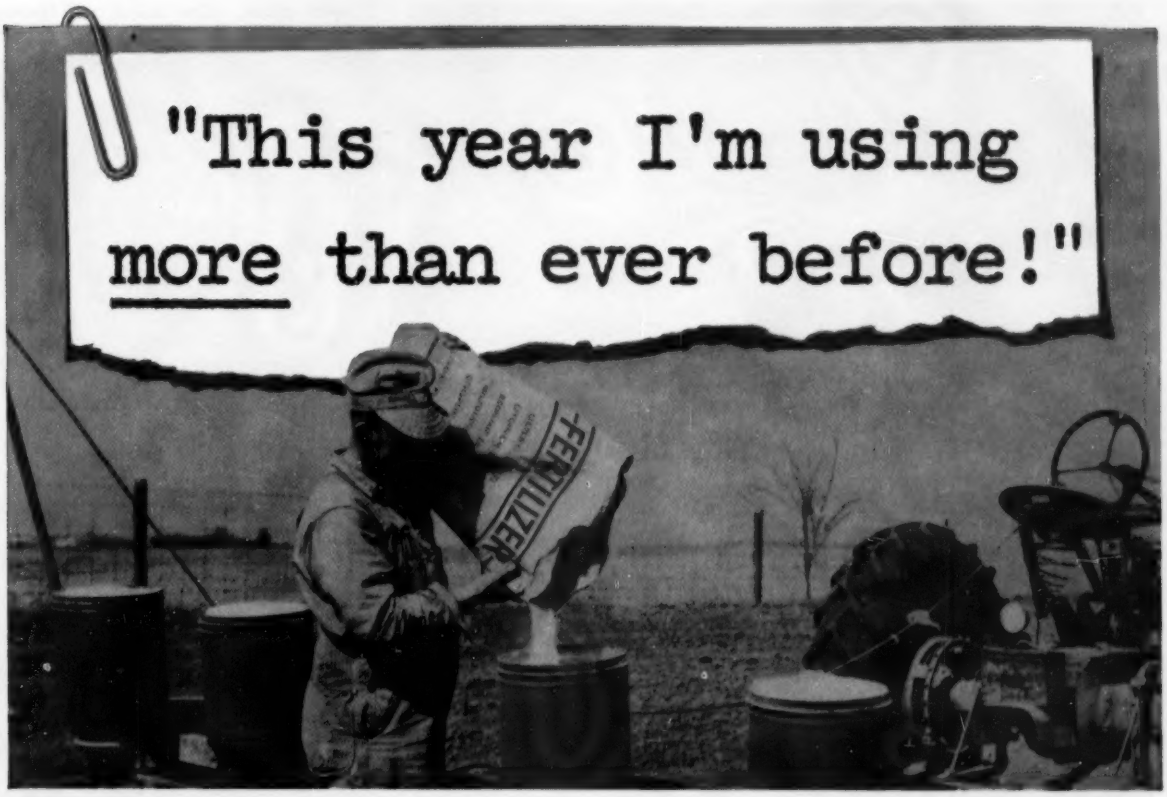
The farmer is in a cost-price squeeze today. He is faced with acreage restrictions, lower prices for crops he sells and higher costs for things he has to buy.

Fertilizers are vital to farm profits, because fertilizers produce big extra yields from smaller acreages, thus assuring a greater return from land, labor, machinery and other fixed expenses.

The importance of fertilizers in the present situation should be brought strongly to the attention of the farmer. Nitrogen Division, Allied Chemical & Dye Corporation, is doing something about it!

The advertisement shown on the opposite page is the opening gun in a powerful and continuing campaign directed to the attention of more than 3½ MILLION readers of farm magazines.

This campaign will serve the best interests of the farmer, the fertilizer manufacturer, the county agent, the country banker, the experiment station, the extension service and all others interested in a profitable agriculture.



THIS YEAR many of the best farmers are using more fertilizer than ever before. With farming costs going up and farm profits coming down, they want the extra yields of high-quality crops that fertilizer adds to every acre at such low extra cost.

Figure it out for yourself. Your investment in land, labor, seed, machinery, insect control and other fixed expenses is the same whether your yields are high or low. When you double or triple your yield through the use of more fertilizer, you have two to three times as much crop income to carry your fixed expenses. Your only extra costs are the cost of the fertilizer and harvesting the extra yield. The extra yields added by fertilizer are the lowest cost and most profitable share of your crop. You are in better shape to make a good profit despite low crop prices, acreage restrictions and other conditions beyond your control.

If you grow corn, for example, do you know how many bushels per acre you have to produce to cover fixed expenses? In one state the break-even point is 40 bushels per acre. In another state it varies from 30 to 70 bushels per acre depending on the value of the land. If your break-even point is 40 bushels and your yield is 35 bushels, you've lost money. But, if you use enough fertilizer to increase your yield to 100 bushels per acre, you make a big profit.

First consideration should be given to the important economic fact that a bushel or a pound of any crop can be produced much more economically when the yield is high than when the yield is low. The yield per acre bears a positive relation to the cost of production and the yield is dependent on the fertility of the soil.

Fertilizer is your best investment. The price of fertilizer has not gone up like the prices of many other things the farmer buys. Fertilizer grows farm profits. Returns from thousands of tests show that $1 invested in fertilizer produces an average return of $3.75 in extra yields. On many crops the return is much higher. Put more fertilizer to work for you. It's your best answer to the present farm situation.

The fertilizer industry serves the farmer. Nitrogen Division serves the fertilizer industry as America's leading supplier of nitrogen for use in mixed fertilizers.

See Your County Agent

Ask your County Agent to recommend the analyses and the amounts of fertilizers best suited to produce big yields of the crops you grow on your soil. His advice to you is based on the latest official recommendations from your Extension Service and Experiment Station.

See Your Banker

Bankers are alert to good investments. They know that fertilizer pays a big return in the short period of a growing season. If you need money to buy more fertilizer, most bankers consider the extra yields produced by fertilizer as an excellent risk.

See Your Dealer

Your fertilizer dealer can supply you with a good brand of fertilizer in the amounts and analyses as recommended by your County Agent. Help your dealer to get your fertilizer to you on time by placing your order early and accepting prompt delivery. Use more fertilizer than ever before and have it on hand when you need it. Remember, fertilizer grows farm profits. Use enough to really pay you big!

NITROGEN DIVISION Allied Chemical & Dye Corporation
New York 6, N. Y. • Hopewell, Va. • Ironton, Ohio
Omaha 7, Neb. • Indianapolis 20, Ind. • Columbia 1, S. C.
Atlanta 3, Ga. • Kalamazoo, Mich. • Columbia, Mo.

Fertilizer Grows Farm Profits

Simonsen Mfg. Co. of Quimby, Iowa announces production of a bulk fertilizer spreader designed for use on high analysis fertilizer.
This spreader has stainless steel components at various vital locations and employs stainless steel wire belt in conveying the fertilizer to the hydraulically operated distributing fan.

plant—40 long tons per day using 350 atmospheres of pressure comprising compressors, converters, refrigeration equipment, ammonia storage vessels, etc.;

Contact sulfuric acid plant, 160 long tons per day; phosphoric acid plant, 25 long tons of 30 percent P_2O_5 per day; ammonium phosphate plant, 50 long tons of 16/20 N-P mixture; and ammonium sulfate plant, 75 long tons per day, comprising crystallizer using ammonia and sulfuric acid, dryers, and ammoniated superphosphate plant.

JAPAN

Nihon Gas Kagaku Kogyo, K.K., Tokyo, have retained **Chemical Construction Corp.** a project which will include an ammonia plant of 100 daily ton capacity and a 90 daily ton urea plant. The latter will incorporate Chemico's full recycle process.

TURKEY

The new fertilizer factory at Kuetahiya, to be the largest in the Middle East with capacity of 60,000 annual tons of ammonium sulfate, 50,000 annual tons of ammonium nitrate fertilizer and 1,000 annual tons each of pure ammonium nitrate and pure ammonia, will be supplied with technical equipment by the **Badische Anilin-und-Sodafabrik,** Ludwigshafen, Germany. The equipment will cost almost $20,000,000.

Announcement

Official Publication of Association of American Control Officials

Available Dec. 1, 1955 at $2.00 per copy

(Special discount, lots of 100 copies)

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AAFCO, Drawer 392, Clemson, S. C.

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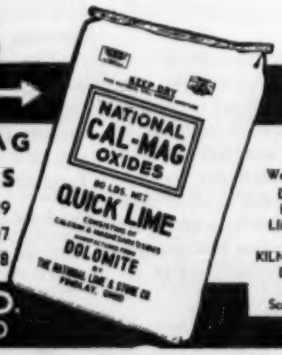

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U. S. P.'s high-grade muriate of potash has the highest K_2O content and is free-flowing and non-caking—important advantages in the manufacture of fertilizers that help make vegetables a more attractive buy for the American dinner table.

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GRANULAR MURIATE OF POTASH 60% K_2O MIN.

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Classified Advertising

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WANTED: Job as Plant Superintendent. More than 25 years experience. Am now employed but have good reason for desiring change. Write Box 34, c/o Commercial Fertilizer, 75—3rd St., N. W., Atlanta, Ga.

FOR SALE: Two used Exact Weight bagging scales, thoroughly cleaned, painted and in excellent mechanical condition. Johnson Cotton Company, Wilmington, North Carolina.

FOR SALE: Two (2) Two-ton U. S. Model 104 Superphosphate Mixers, Two Dust Scales, Two Acid Scales, One Atlanta Utility 1-½ Ton Batch Mixer. All used but good condition. Write Southern Fertilizer & Chemical Co., P. O. Box 1158, Savannah, Ga.

WANTED: Used one ton Stedman mixer; Hammermill, bagging equipment, and other Fertilizer mixing equipment. HY-YIELD SOIL SERVICE, 514 Walnut St., Murphysboro, Illinois.

WANTED: To correspond with fertilizer plant superintendent, age 30 to 40 years, to work with established Central Florida company. Box # 38, c/o Commercial Fertilizer, 75 3rd St., N.W. Atlanta, Georgia.

We are seeking a young mechanical engineer who knows the fertilizer industry and is interested in designing and selling fertilizer machinery and plants. A bright future for a man interested in selling. Please furnish complete resume of personal data, education, age and experience. Box #41, c/o Commercial Fertilizer, 75—Third St. N.W., Atlanta, Ga.

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SITUATION WANTED: Capable, alert young man, M.S. in Agronomy, age 32, married, extensive experience in agricultural field, desires opportunity with progressive concern. Technical, liaison, sales position preferred. Reply Box #31, c/o Commercial Fertilizer, 75—3rd St., N. W., Atlanta, Ga.

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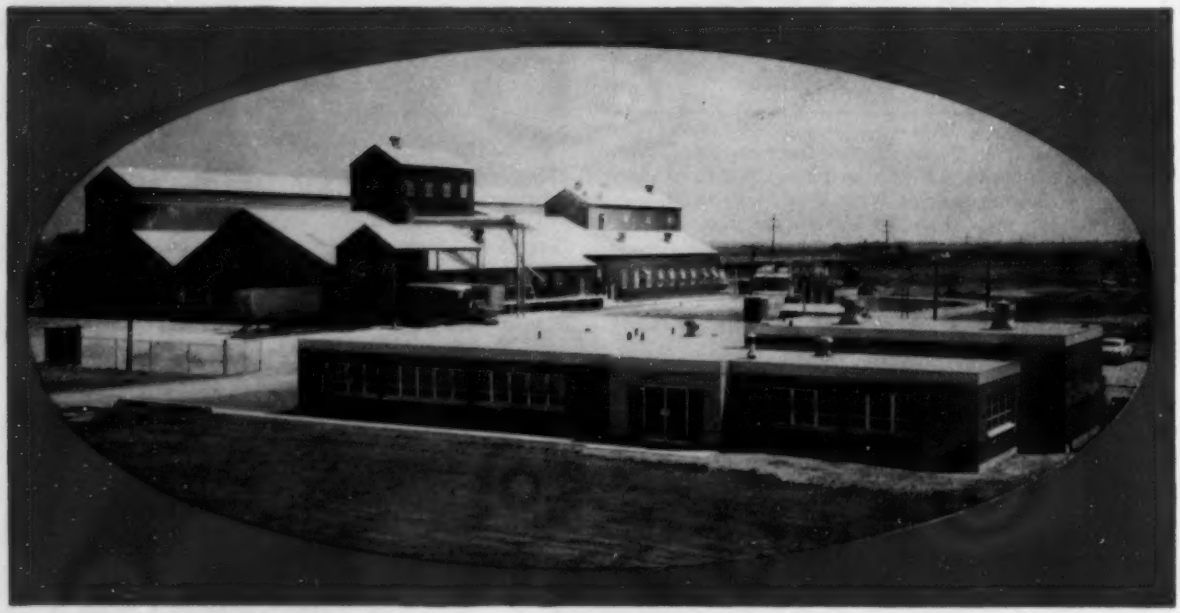

A view of the TVA granular-process fertilizer plant built by Blaw-Knox Company, Chemical Plants Division, for the Illinois Farm Supply Company.

The new Illinois Farm Supply fertilizer plant is now in operation

Designed, engineered and constructed by Blaw-Knox, the *new* TVA granular-process fertilizer plant of the Illinois Farm Supply Company at Tuscola, Illinois, is the latest productive addition to the growing fertilizer industry. It is a modern, up-to-date and highly efficient plant, fully equipped with every facility for processing, storage, bagging, and shipping, designed for fast and economical production of top quality granular fertilizer.

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Blaw-Knox Engineers are specialists in the design and construction of process plants of every description. We can furnish a *complete* fertilizer plant of any desired capacity or convert existing units into more modern and profitable operations. We welcome the opportunity to submit our recommendations.

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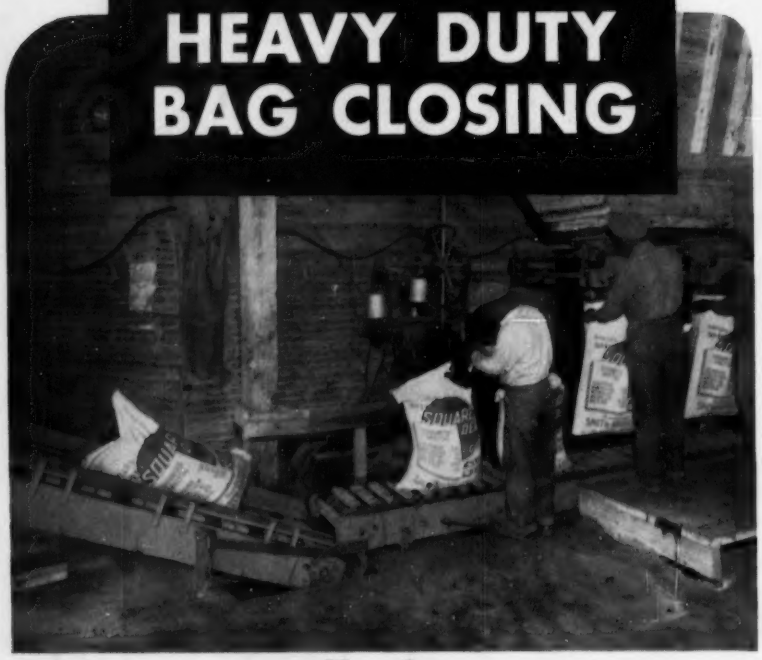

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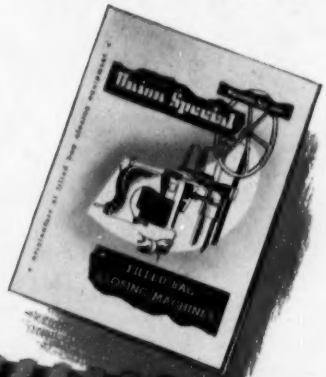

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